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Efficiency Without Volume

Inventory Control, Reduction of Waste and Intelligent Adaptation of Materials-Handling Equipment Are Features of Stutz Plant

BY BURNHAM FINNEY*

IN a period when automobiles are being manufactured by the thousands on the basis of mass production, it is uncommon to find a company that has as its slogan, "No two cars alike." Yet this is the policy on which the Stutz Motor Car Co. of America, Inc., Indianapolis, has built a substantial business.

The fact that its manufacturing process calls for individuality, rather than standardization, in turning out what might well be termed a custom-made car, does not imply that the company overlooks opportunities for introducing production economies. Its methods of controlling inventory, of reducing wastage, of handling materials mechanically, of inspecting all parts minutely and of machining castings by special operations have been responsible for the attainment of a high degree of efficiency.

Stock Turned Over 18 Times a Year

By closely watching its manufacturing schedules, the company has been able to turn over its stock 18 times a year. The entire plant has only one stockroom, which is adjacent to the receiving department, and all departments call upon this source of supply when in need of small parts. The larger units, such as bodies and frames, do not pass through the receiving department, but instead are delivered directly to the point where work is first begun on them. The flow of material into the factory is regulated so that the stockroom is not crowded beyond its normal capacity and so that the number of larger units passing into the plant never exceeds the current demand, all unnecessary storing thereby being eliminated.

The amount of stock on hand at any time can be computed from a master file in the office of the receiving clerk. The stock record consists of a yellow card, 6 x 9 in., on which the part name and the part number are put down. At the left side is a place for information about the purchase of the part, while the receiving, inspection and stores record occupies the center of the card. Data regarding the issuance of parts to the production department or to the service department are set down in a space at the right side. In connection with the purchase record, there is a column in which the number of parts returned to the maker can be en-

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In the Assembly Line, Turntables Are Used to Make Rectangular Transfers of the Automobile Frames

tered. In addition, a record is kept of the quantity rejected and salvaged.

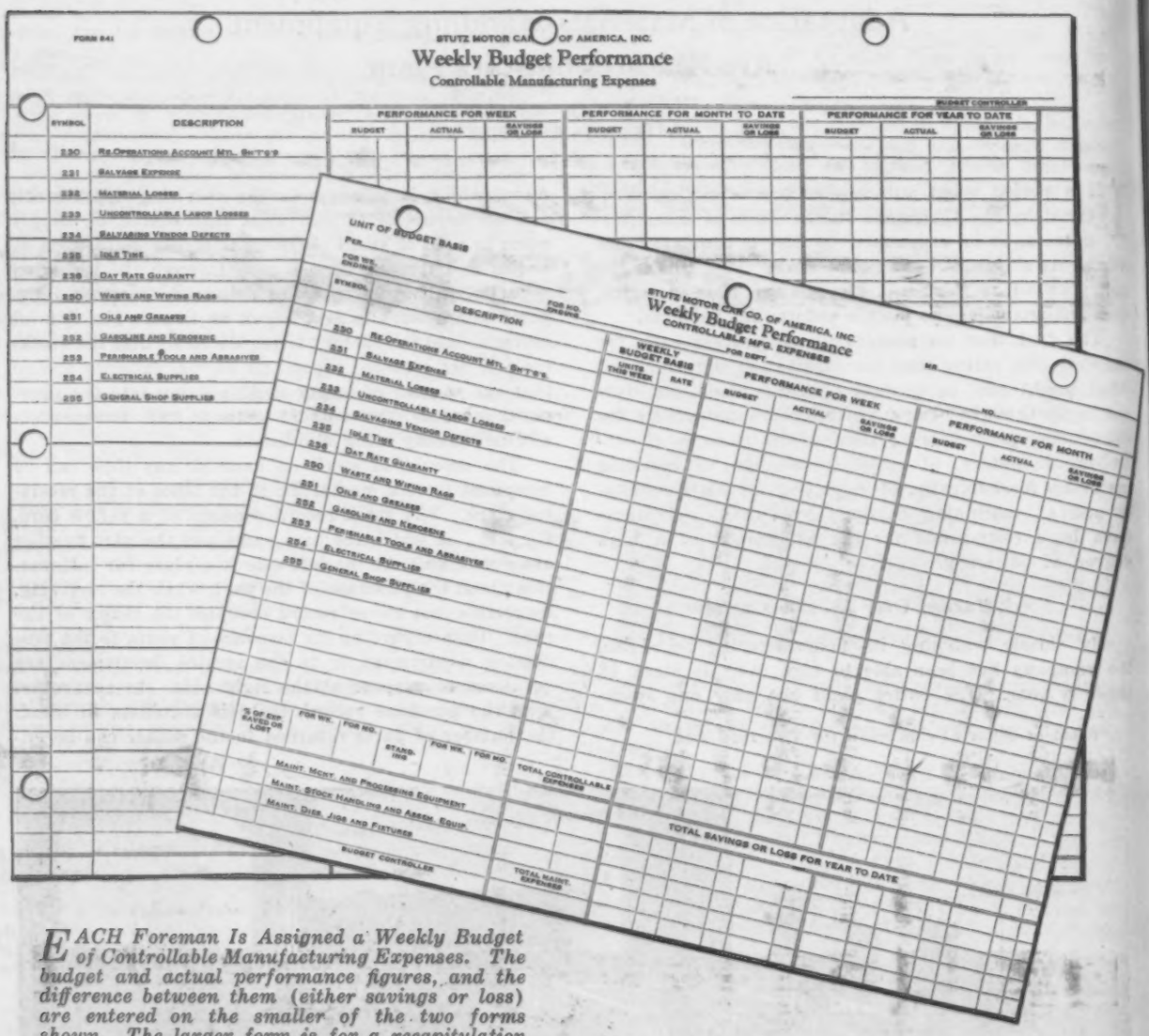
Whenever parts are issued from the stockroom, the amount taken is subtracted from the total previously on hand, so that the clerk has before him the exact number of all parts that are in stock. For example, he can turn to the card showing the record of part No. 20,911, which is a "stop and back up light switch." By looking at the column at the right marked "on hand," he can determine the number of stop and back up light switches in stock. Furthermore, by going through the file and ascertaining from each card the same information, he can tabulate in a short time the inventory of the entire factory. Aside from the receiving clerk's office, the only other place in the plant having these data is the purchasing department. This simplified plan does away with the annoyance of having numerous departments cluttered up with records

Incidentally, this rule has some exceptions in that some men on special work are paid by the piece.

Inspection Charged to Production

Inspection of materials and of parts is so precise that wherever 100 per cent inspection is specified the expense of the inspectors' wages is charged to production instead of overhead expenses. Generally, in such cases, inspectors are concentrating their attention on one type of work. An example of this method of charging costs is found in the receiving inspection department, where time for the thorough examination of 28 parts is applied to manufacturing costs rather than to standard burden.

Among the instruments used in the receiving inspection department are a Brinell machine for ascertaining the toughness and hardness of certain parts, such as connecting rods and other forgings in which



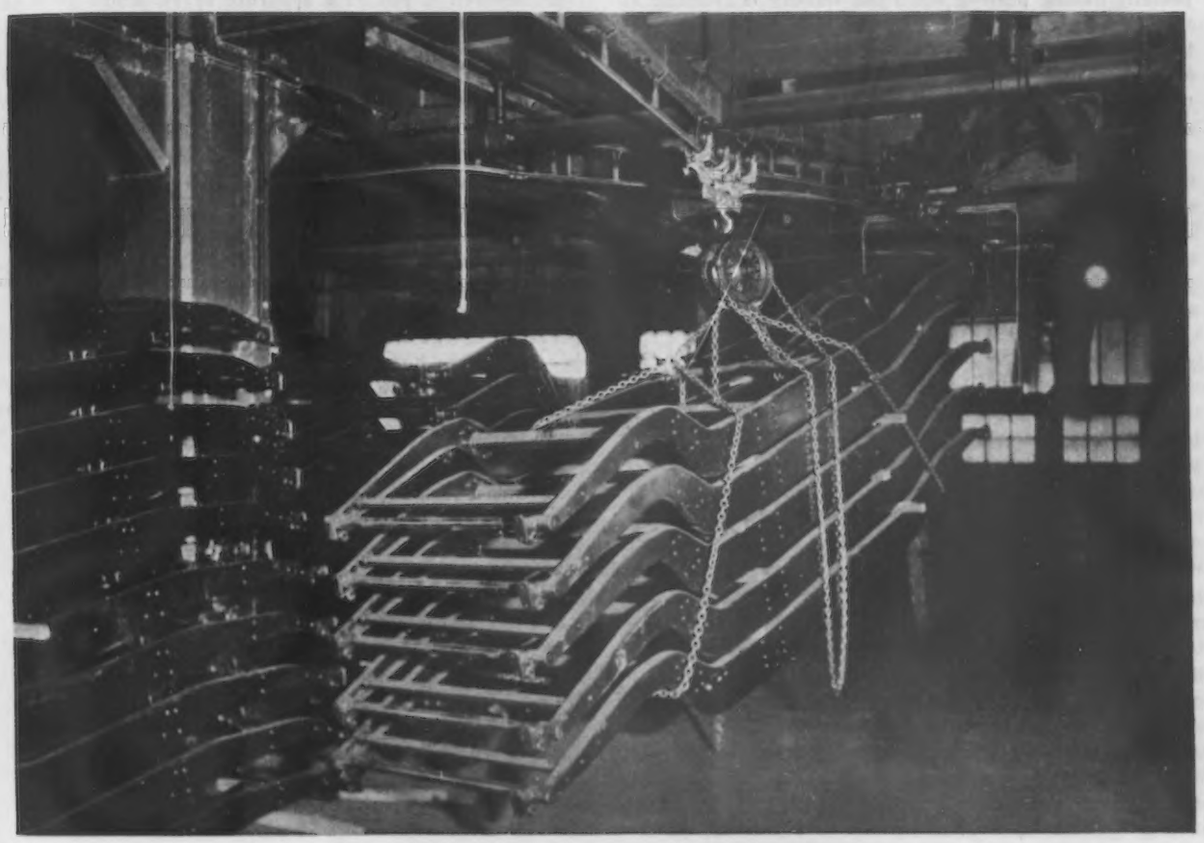
EACH Foreman Is Assigned a Weekly Budget of Controllable Manufacturing Expenses. The budget and actual performance figures, and the difference between them (either savings or loss) are entered on the smaller of the two forms shown. The larger form is for a recapitulation of the figures received from all the foremen

duplicating those which are available at all times in the office of the receiving clerk.

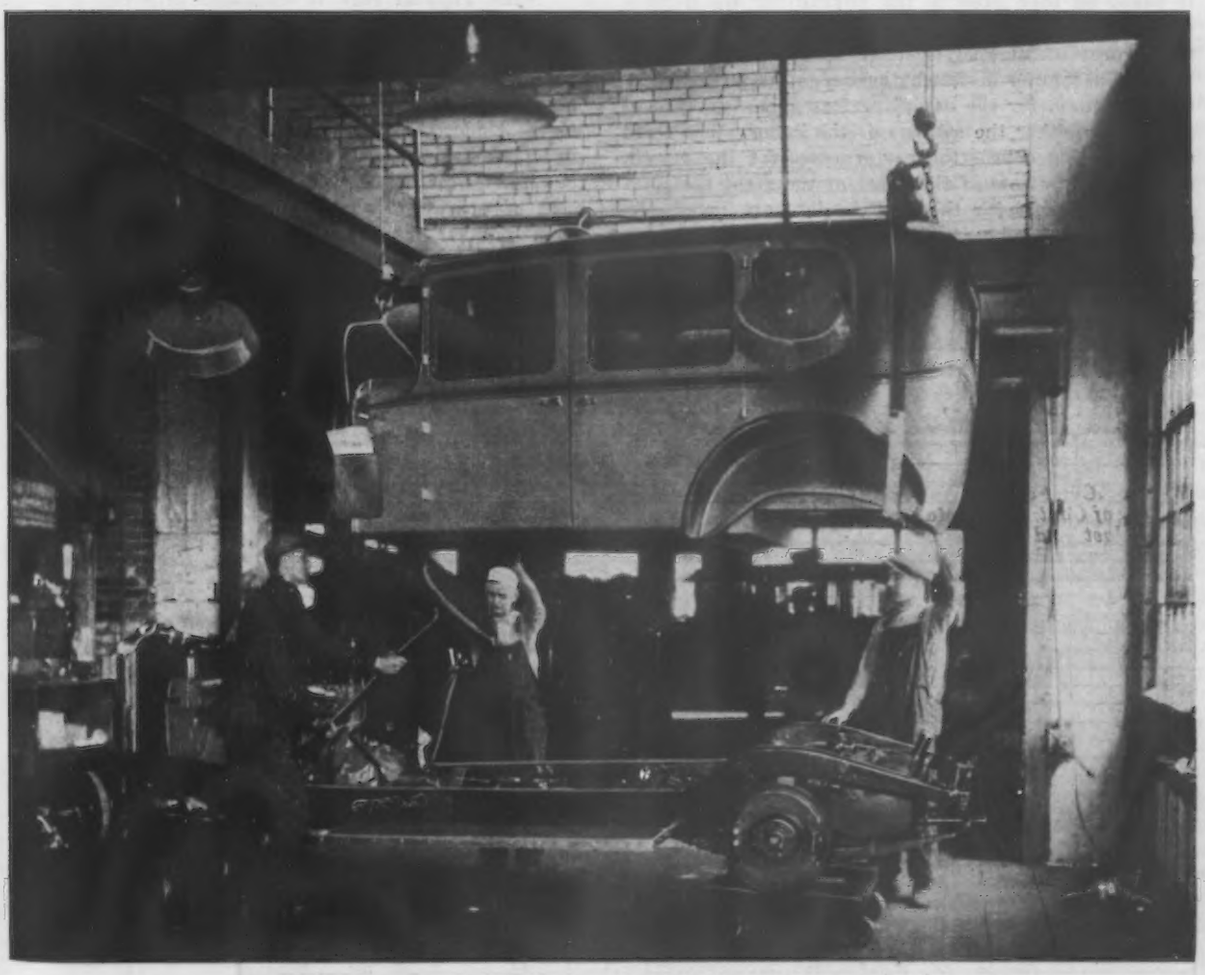
Payment of wages is based on a group plan. Workmen are formed into small gangs of not more than 25 men and a wage rate is established for each man, but the amount of wages is determined by the number of units turned out by the gang. For instance, each operator working along the motor assembly line has a wage rate based on the degree of skill and the kind of work he does. He is paid, however, according to the number of motors which come off the assembly line rather than on the individual operations he performs.

great strength is required, a Rockwell hardness tester, and a scleroscope, which determines the hardness of camshafts, piston pins, connecting rod bolts and other parts. Other inspections include the weighing of valve springs, the comparison of all front-end drive chains with a master chain, the checking of all camshafts with a master shaft on the comparator and the testing of chassis springs for equalization.

Since the company is on a basis of quality output rather than mass production, the employment of workmen whose versatility is above the average is imperative. In many departments each operator is called



(Above) Frames Are Handled in Quantities by Overhead Monorail. (Below) When the chassis has been assembled, save for mounting wheels and tires, the body is lowered through a well from the floor above



upon to do several things requiring unusual skill. Especially during periods when the factory is running at less than capacity and the number of workmen is below normal is the versatility of each operator brought into play, for often one man must divide his time between the work to which he is accustomed and a job ordinarily done by another man.

Each large division of the plant, such as the machine shop, is in charge of a foreman. Under him are various gang leaders, each of whom may be supervising gangs in two or three departments. This arrangement makes for the concentration of responsibility and gives to the foremen authority generally lodged in the superintendent in the average metal-working plant.

Budget Plan Cuts Down Waste

Wastage in all departments has declined to a marked extent through the successful operation of a budget plan recently devised. The plan calls for a yearly budget that allows each department a stated amount each month for wastage and other losses. Each foreman receives a "weekly budget performance" of controllable manufacturing expenses on a form sheet, 8½ x 11-in. On this sheet are listed the following items: Re-operations account, material shortages, salvage expense, material losses, uncontrollable labor losses, salvaging vendor defects, idle time, day rate guaranty, waste and wiping rags, oils and greases, gasoline and kerosene, perishable tools and abrasives, electrical supplies and general shop supplies. There are some items not included which the foreman must fill in to complete the record for his department. For example, the foreman of the machine shop would add setting-up time, tool grinding and sweepers and janitors.

Next to the names of the items is a column for the weekly budget basis, in which the units for the week and the rate are to be listed. The unit of the budget is based on each $100 of the payroll for the department. The second major division of the sheet gives the figures of the performance for the week. Here there is a column in which the budget is put down, a second column for the actual performance figures, and a third for either the savings or the losses. The third major division details the performance for the month, while at the bottom of the sheet at the right the total savings or losses for the year to date are listed. In the lower left hand corner are given expenses for maintaining machinery and processing equipment, stock handling and assembling equipment, and dies, jigs and fixtures. A recapitulation of the figures from all of the foremen is put on a separate sheet, which goes to the superintendent of the plant.

Bonuses Given Foremen for Reducing Losses

To create and maintain a spirit of competition among the foremen in cutting down wastage, the foreman making the best showing each month receives from the management a bonus of $25. Bonuses of $20, $15, $10 and $5 also are awarded to the second, third, fourth and fifth positions. Winners are chosen on the basis of the percentage of savings in the departmental expense of indirect labor, material and direct labor losses and manufacturing supplies. To the foreman performing the most outstanding service each month goes an extra bonus of $25. Each of the three operating officials names the foreman who has, in his opinion, contributed the most in the previous month to the efficiency of the organization as a whole. These names are submitted to the foremen, who vote for the man they consider most deserving of recognition, and the man getting the highest number of votes wins.

Every morning the foremen gather in the salvage room, into which, during the previous day, has been brought all material branded as defective. At this meeting the foremen examine each piece to determine whether it can be salvaged, whether it shall go to the scrap pile or whether it should be returned to the maker. Thus, since each man sees his fellow foremen examining the defective work turned out by his department, his pride spurs him in his efforts to increase the efficiency of his men. It is interesting to note, in this regard, that in less than a year the size of the salvage department has been cut 50 per cent, this decrease reflecting a corresponding lowering of waste.

Variety of Materials-Handling Methods Used in Progressive Assembly

Since unusual care is exercised in every activity, from the examination of raw materials as they come into the factory to the final inspection, when the car is ready to be shipped to the dealer, the movement of parts from one operation to the next is necessarily slow. Under the circumstances, a straight-line conveying system, depending for its success upon a continuous flow of materials, would be impractical, because its cost of operation would be excessive in view of the small number of units which would move along it daily. However, this does not mean that the company cannot use mechanical transportation of materials to lower

FORM NO. 69 2 per Job.

STUTZ MOTOR CAR CO. OF AMERICA

STOCK RECORD

PART No. 20911

PART NAME Stop & Back Up Light Switch -BB-

MAX. MODELS UNIT

MIN. GRADE

PURCHASE RECORD							RECEIVING—INSPECTION—STORES								ISSUED							
DATE	ORDER	QUAN.	TOTAL	RETURNED S.O. No.	RETURNED QUAN.	RETURNED NET	DATE	PUR. ORDER	REC. No	QUAN.	TOTAL	QUAN. REJ.	QUAN. SALV.	QUAN. GOOD	TOTAL GOOD	DATE	TO PROD.	TO STR.	TOTAL	ON HAND	SALV.	SCRAP

From Stock Record Cards, Kept in the Receiving Clerk's Office, the Amount of Stock on Hand Can Be Computed at Any Time

production costs; it merely signifies that to meet special conditions specially designed equipment has been constructed to take the place of standardized conveyors. But there are several parts of the plant in which standard types of conveying equipment are used.

Automobile frames are taken by hoist from the first floor to the second through an opening in the ceiling, and the same means is used to lower fenders and other enameled stock from the enameling department to the assembly line at the points where they are needed. Frames are carried in lots of five on a Louden overhead monorail conveyor to the various operations in the frame department. Then they are taken by hoist to the next floor to the beginning of the assembly line. Incidentally, the frame is upside down when it reaches the line, so that the front and rear axles, springs, spring shackles and step hangers and brackets can be put on conveniently. When this work is completed, workmen slip a chain around the frame, raise it a few feet with a block and tackle, turn it right side up and place it on small trucks running on a narrow-gage track, a truck being placed under the front axle and another under the rear axle.

Foremen Meet Every Morning and Examine Each Piece of Rejected Material to Determine Whether It Can Be Salvaged

As the frame starts down the track, shock absorbers are assembled and the brake, shields, brake tubing, propeller shaft and exhaust muffler are installed. In progressing along the track, the frame is sprayed with lacquer in a booth containing a turntable so that the frame can be moved around quickly for the convenience of the workman. When the frame reaches the corner of the room, it swings about on another turntable and starts away at right angles. Within a short space the running boards, gasoline tank, shock absorbers, battery box, battery, gasoline line, chassis-lubricating oil lines and electric wiring are installed.

Body Lowered Through Well to Chassis Below

As the chassis moves along the assembly line, the motor is dropped into place, the radiator is put on and the brake system is filled. Next the chassis-lubrication oil reserves, or magazines, are filled, and oil is forced at high pressure through all of the spring bushings. A few feet farther on, the steering gear assembly is installed and the body is mounted on the chassis. The last-named operation is particularly interesting. The assembly line is on the second floor and the body department on the third. Finished bodies are brought to an open shaft directly over the assembly line where the body is to be mounted on the chassis. The body is then lowered by means of a hoist into the proper position on the chassis.

Tires and wheels are brought from the wheel department on the fourth floor to the assembly line by means of a chute just wide enough for a tire to move easily in an upright position, handling costs having been eliminated by this inexpensive method.

In the machine shop a variety of methods is used for handling materials. In two instances roller conveyors are utilized for carrying certain parts a short distance, but this is the exception rather than the rule. For transporting heavy castings from one machine to another a Louden overhead monorail system, with various types of carriers suspended from the monorail, is used.

In some parts of the shop, tools are so compactly arranged that the castings being machined are within reach of the man in charge of the next operation. For interdepartmental hauls electric lift trucks have been found economical. These are particularly satisfactory for conveying small parts from the stockroom to the departments where they are needed.

Nowhere in the plant is greater care taken than in the painting department. Bodies "in the white," or in their raw state, are filed to remove the major rough spots from the metal, and then are sanded to eliminate any minor roughness. An acid bath takes away all dirt, filings and other particles that might cause a rough paint surface or keep the paint from adhering. After priming and filler coats have been applied, the bodies are sent to baking ovens. After the baking process the bodies are again rubbed, from four to eight coats of lacquer are sprayed on and finally a coat of "thinner" is applied. After the polishing, hairline stripes are painted on the molding of the bodies and along the hood louvers. One of the distinctive features is the fact that there are no two cars on which the combination of colors, especially the stripes, is the same.

By means of the methods just described the Stutz Motor Car Co. is manufacturing a car on a plan of stressing quality and individuality. To achieve the best results, principles of mass production have been adopted successfully in some cases, but in other instances special problems have required special treatment. That its means of handling materials, its efforts to prevent wastage, its thorough inspection of parts and its close control of inventory have contributed directly to economical production is the testimony of the management.

Cuts Costs of Laying Cable

Completely automatic, a novel subterranean cable-laying machine, said to have been designed by a German manufacturer, has been in operation in Germany since last October, says a report received by the industrial machinery division, Department of Commerce, from Trade Commissioner Thomas Butts, Berlin. The machine is a combined trench digger, cable layer and trench filler. It is said that the cost of laying cable has been reduced 75 per cent by this device and that, with a crew of only five men, it does the work formerly accomplished by 150 workmen. The entire apparatus is 18 meters (60 ft.) long and three meters (10 ft.) wide and weighs 22 tons. The digging apparatus alone weighs 15.5 tons, and the cable car weighs 6.4 tons.

"Use of Welding in Fabrication," was the subject of a joint paper given by H. V. Putman and C. C. Brinton, Westinghouse Electric & Mfg. Co., at the monthly meeting of the Pittsburgh section, American Welding Society, in the quarters of the Engineers' Society of Western Pennsylvania, William Penn Hotel, Pittsburgh, Wednesday evening, May 2. Mr. Putman talked on design and manufacturing, and Mr. Brinton on the engineering phases of the subject.

Mill to Roll New Carnegie Beams

Bloomer and Three Stands Designed for Huge Tonnage—Automatic Control of Screwdowns a Feature

BY SIDNEY G. KOON*

IN 1925 nine mills of more or less ancient vintage occupied the site to be utilized in the reconstruction of the structural unit at the Homestead Works of the Carnegie Steel Co. To keep these mills running during the construction period was an engineering feat of itself. But by shifting hot beds, and even reversing the direction of travel from the hot beds, all were kept in operation until the first new unit, the standard structural mill, was in service. These old mills consisted of a 40-in. blooming mill and 35-in. structural mill; a 33-in. blooming mill and 23-in. and 33-in. structural mills; 28-in. and 38-in. blooming mills and two old merchant mills, 16-in. and 12-in., which had long been inactive. All have been completely dismantled; the last, the 38-in. blooming mill, went a few months before the Carnegie H-beam mill was put in operation.

Included in the new development are a dual set of mills running parallel to each other, with a large motor room between them, and with soaking pits at the end so interconnected that, although one set nominally serves one mill and the other set the other mill, ingots may be shifted from either set to either mill. There are 26 acres covered under the one roof. Incidentally more than 1000 tons of structural steel to the acre were used in putting up the building, which is reported to have a total of 26,818 tons in it.

One set of mills includes a 44-in. blooming mill, followed by a 36-in. roughing mill and 28/32-in. structural mill rolling standard sections. This was the first installed and it has taken over the work of rolling the sections formerly made in the old, discarded mills. When this unit got into production the remainder of the site was cleared of the older equipment.

*Associate editor THE IRON AGE, New York.

At the north side of the motor room the new mill rolling the Carnegie H-beams was then put in. This consists of a 54-in. blooming mill, the largest and heaviest in the world, and three 52-in. sets—roughing, intermediate and finishing.

This group was designed for a production of 26,000 tons a month, but has actually had a maximum day as high as 2533 tons. The Carnegie beam sections rolled comprise a series of 42 structural shapes in 11 depths ranging from 8 to 30 in. They have flanges of uniform thickness—in other words, parallel—throughout their width, and are designed to cover the range of maximum structural demand for buildings and bridges and provide simple rolled sections where, previously, large tonnages of built-up members were required. Sections are provided within this range suitable for use as beams, girders and columns, with flange widths varying from 6 to 15 in. and in weights from 21 to 425 lb. to the foot.

Clearing of the site of the new mill was started March 6, 1926. The first ingot was rolled in the blooming mill Nov. 10 of that year and the first H-beam in the 52-in. mill on Dec. 30. Trial beams had gone through previously and necessitated slight adjustment of the rolls, until production really got under way, as mentioned, just before the end of the year.

Large Electric Units Required

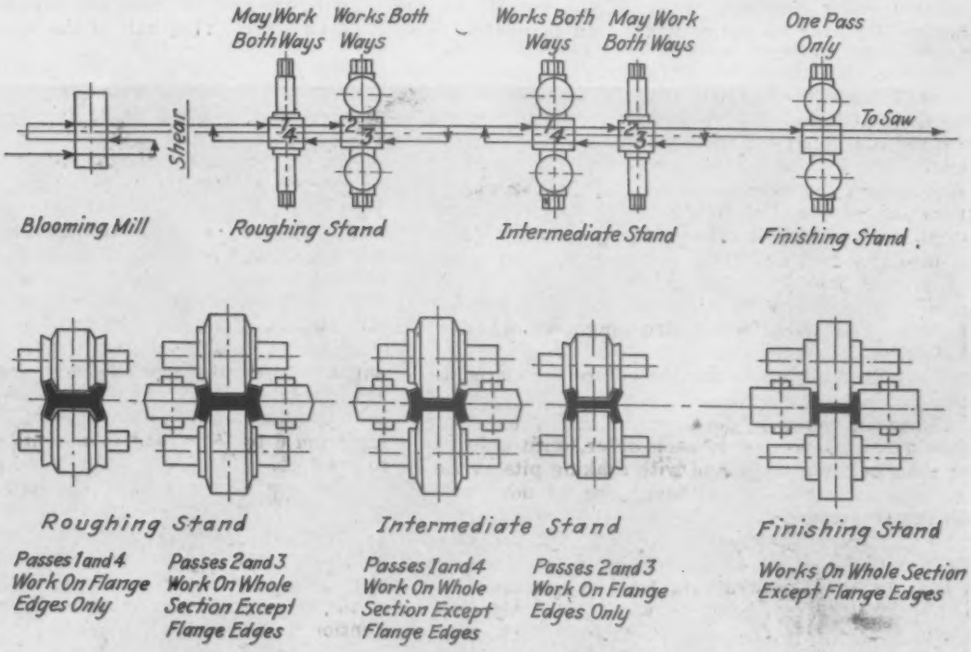
In conjunction with the new equipment, a 15,000-kw. turbo-generator, with boiler plant and auxiliaries, was installed at the Carrie furnaces across the river. Electric drive is used throughout and the interconnecting control on the electric basis is most elaborate. The roughing and the intermediate sets have two motors

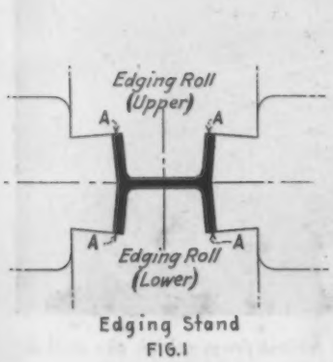
Manipulator Handling Beam Blank for the 54-In. Blooming Mill, Which Appears in Background

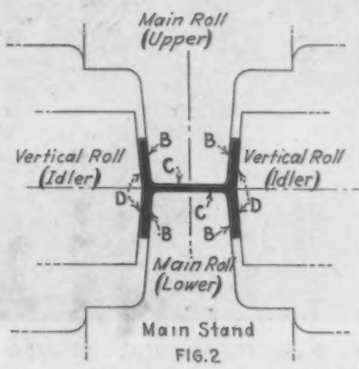
each, one of 7000 hp. for the main stand and one of 2000 hp. for the edging rolls. These are so controlled in each case that the bar between the sets of rolls (12 ft. apart) driven by these two motors is neither stretched nor forced. In other words, the speeds of the respective rolls are synchronized automatically with each other. Both these stands are reversing, and the motors correspondingly are of the reversing mill type.

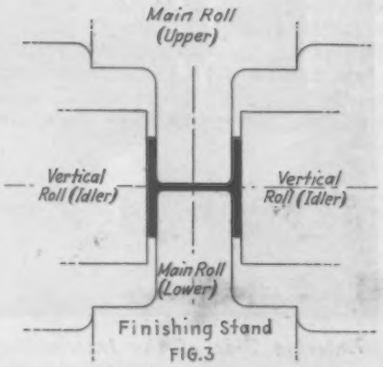
The finishing stand is operated by a 5000-hp. induction motor, non-reversing. Only one pass is made on this stand, whereas customarily there are nine passes through the roughing stand and five through the intermediate, making an average total of 15 passes. The blooming mill is driven by an 8000-hp. motor, which has a maximum operating peak rating of 14,400 hp. This also is a reversing unit, the largest of this type ever built.

How the Three Stands of Rolls Work Successively on the Steel. Fig. 1 shows the action in the "edging" rolls preceding the roughing stand and following the intermediate stand. Fig. 2 indicates the action of vertical and horizontal main rolls in roughing and intermediate stands. Fig. 3 shows the straightening and planishing effect of the finishing stand


May Work Both Ways
Works Both Ways
Works Both Ways
May Work Both Ways
One Pass Only
Shear
To Saw
Blooming Mill
Roughing Stand
Intermediate Stand
Finishing Stand
Roughing Stand
Passes 1 and 4 Work On Flange Edges Only
Passes 2 and 3 Work On Whole Section Except Flange Edges
Intermediate Stand
Passes 1 and 4 Work On Whole Section Except Flange Edges
Passes 2 and 3 Work On Flange Edges Only
Finishing Stand
Works On Whole Section Except Flange Edges







Flexible Control for Soaking Pits

At the west end of the plant are the soaking pit furnaces. There are seven units of four holes each in the north bank, designed for serving the H-beam mill, and a duplicate set in the south bank for serving the structural mill. The stacks are in the middle between the two sets. Tunnels under the pits, providing access to the regenerator chambers and gas-control apparatus, are provided with a considerable amount of automatic equipment. One man on each turn suffices to look after these underground sections.

Special control equipment for the soaking pits permits the pit craneman to open or close the pit covers during charging or drawing of ingots. Each bank of pits is served by two 15-ton low stiff-leg cranes, spanning four pits at once. The lines of pits are located about 40 ft. apart and the contact rails are in sections of 40 ft. to correspond. The ingot car is under the control of either craneman and is set in the most convenient position for loading. While the craneman cannot operate any pit except those opposite the section of contact rail in which he happens to be at the moment, they may be operated from the floor by the usual electric control. Safeguards are provided so that, when the pit cover is being operated from the floor, it cannot be moved by the craneman.

When the ingot has been loaded into the ingot car the craneman starts the loaded car toward the blooming mill. The car is automatically stopped, without further attention from him, and the ingot is dumped upon the waiting transfer car by the transfer car operator. This car operates on a track running at right angle to the approach tables to the 44-in. and the 54-in. blooming mills. One man operates the two transfer cars serving the two mills. He also controls both ingot cars after they have passed into the dumping zone.

The track accommodating the ingot transfer buggies extends far enough beyond the approach tables to the two blooming mills so that either buggy may serve either mill, although in regular operation the north buggy serves the north mill and the south buggy the south mill. This arrangement makes for great flexibility in case of breakdown of either buggy.

Between the 54-in. blooming mill and the 44-in. blooming mill runout tables is a row of three large reheating furnaces, which are used for supplying the 36-in. mill. H-beams, however, are rolled direct from the ingots through the four sets comprising the 54-in.-52-in. units.

Great Length of the H-Beam Mill Layout

Spacing in the new mill, center to center of main rolls, is 299 ft. from the 54-in. blooming mill to the roughing stand. From the roughing stand to the main rolls of the intermediate stand the distance is 190 ft., with 210 ft. from the intermediate to the finishing stand. Beyond the finishing stand is a transfer table to the hot saw, measuring 208 ft. in length. The longi-

tudinal distance from the blooming mill rolls to the hot saw is 917 ft. 6 in.

As the piece enters the roughing mill it meets first a set known as edging rolls. These are not vertical rolls, as the term "edging rolls" customarily indicates. They are rolls with horizontal axes, and receive their name from the fact that they work only on the toe or edge (*A*, in Fig. 1) of the flanges of the embryo H-beam. They serve also as a feeder into the main rolls, even though they do not effect much reduction. The main rolls do not touch the edges which have just been worked on by the edging rolls, but do work across the entire face of the web (*C*, in Fig. 2) and the inside faces (*B*) of the flanges.

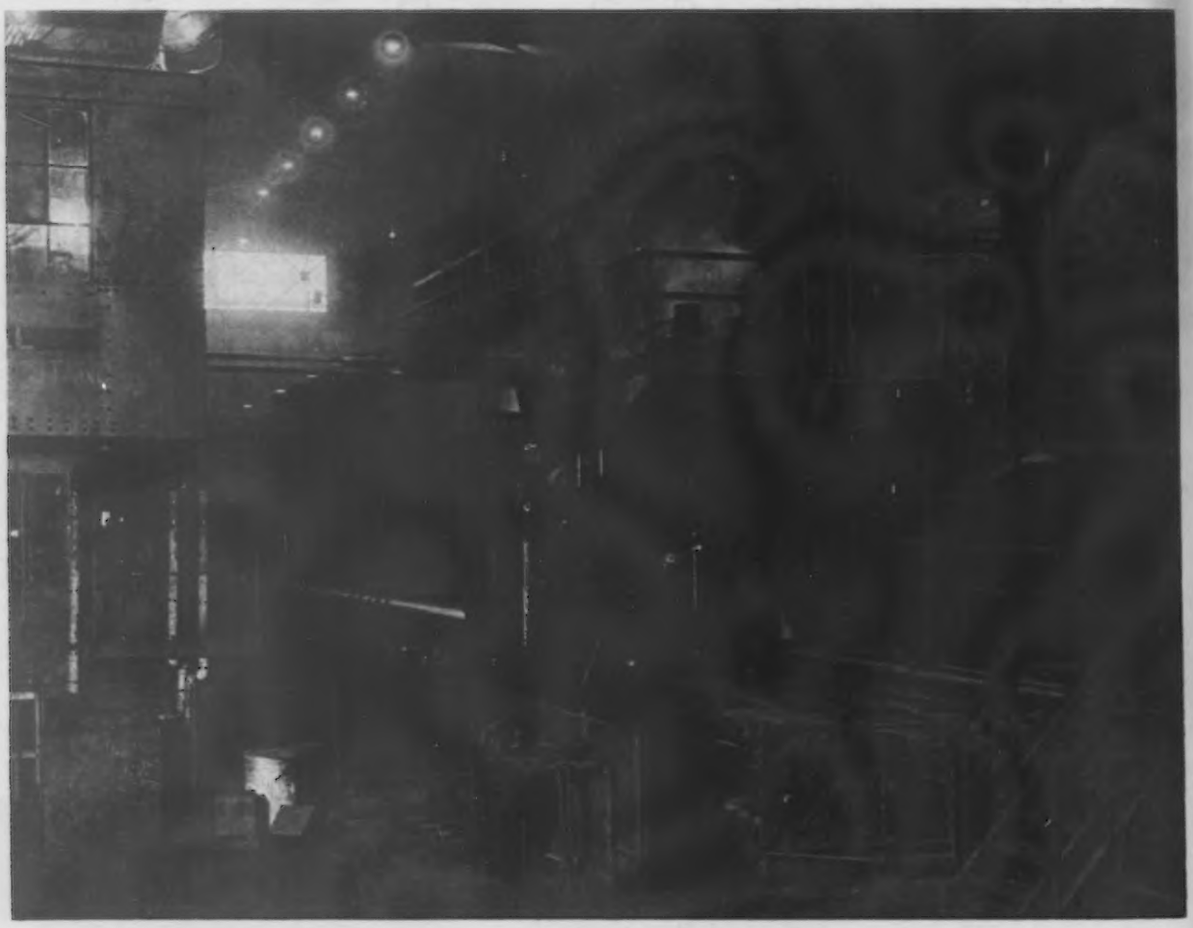
Meantime the rolls with vertical axes, operating on tapered roller bearings, work on the outside of the flange (*D*) over its entire width. In plan view these rolls with vertical axes are in line with the main rolls. They lie between the necks of those rolls, but are not driven. Their rotation is imparted by the steel passing through, but they give to it a definite rolling action nevertheless, through the rigid control over their center distances.

In the intermediate set of rolls this procedure is reversed. The bar by this time has acquired the familiar tongue, so that it may be gripped by the surfaces of the main rolls and pulled through. Here again a set of vertical rolls—idlers—works on the outside of the flange, while the main rolls work on the inside of the flange and clear across the web. In this set the so-called edging rolls come after the main rolls, and give the necessary amount of work on the edges of the flanges. As these edges are not touched in the finishing rolls, it is fitting that they should here be the last to be worked on.

Throughout the preceding process of manufacture the flanges have been flared outward, in accordance with the sketches. This has permitted the operation of the main rolls upon both flange and web, while the idler vertical rolls are shaped accordingly. The sketches exaggerate the angularity, to show the principle. The finishing rolls are primarily merely a straightening and planishing set, including both horizontal and vertical rolls. They overcome the slight angularity of the relation between web and flange, which was greater in the roughing rolls than in the intermediate, and turn out a finished product in which the respective angles are 90 deg. (Fig. 3). Thus it is that the product comes out with parallel-sided flanges.

Stiff Support to the Rolling Members

In the design of the mill it was arranged to have as short a section of unsupported roll between housings as possible. To this end, sets of distance pieces, each set suited to certain sections to be rolled on the mill, are used to space the housings in their relation to each other. That half of the housing which is farthest from the motors and spindles is arranged so that it may be slid, in a direction parallel to the axis of the main rolls, to a position determined by the section to be rolled. Thus, when a 12-in. beam is being rolled, the two halves of the housing are about a foot closer together than when a 24-in. beam is being rolled. All of this means greater stiffness in the equipment and must help uniformity in the product.

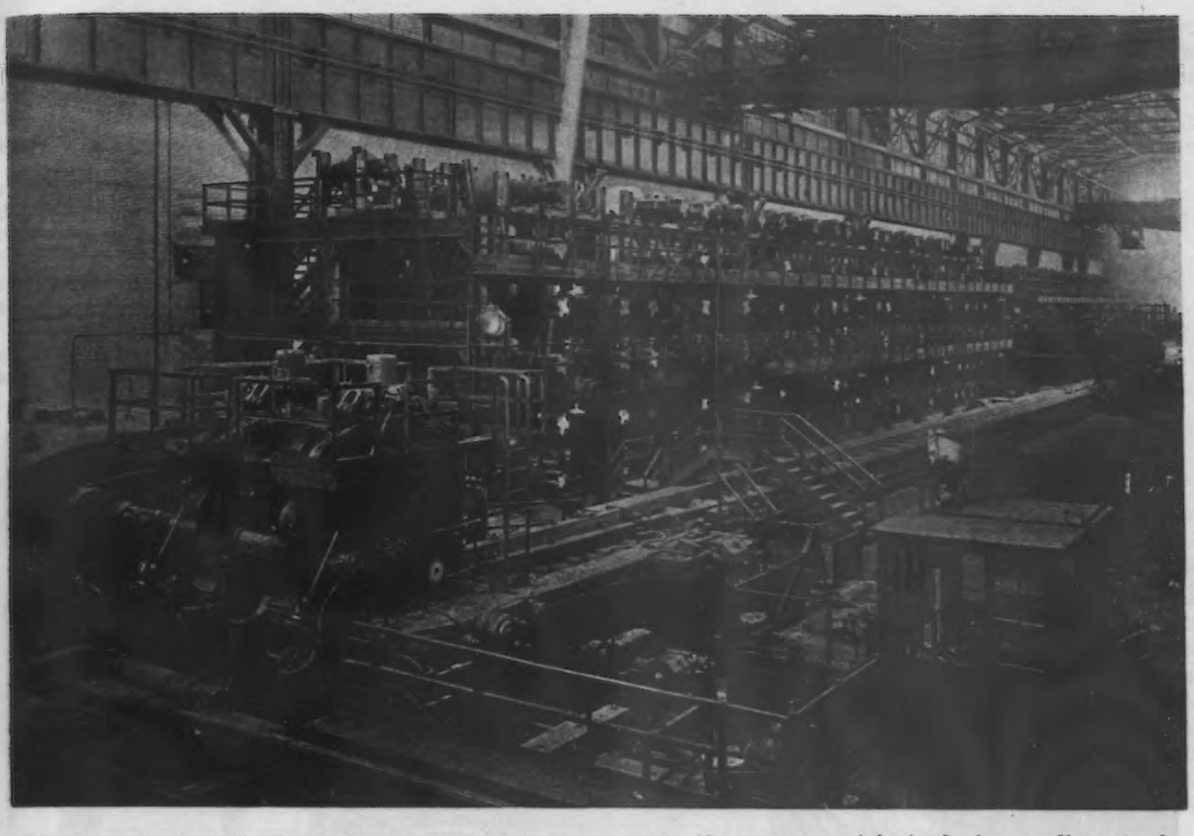


Entering Side of the Intermediate Stand of the H-Beam Mill. At left is the pulpit from which the mill is controlled. A flood light atop the pulpit aids in night work

Pins and other connections used in setting up the mill, on roll changes, are subject to the usual drive fit, thus securing to the highest degree the necessary alinement and accuracy in positioning of the parts.

Spare rolls are stored wholly under cover. Advantage has been taken of the presence of a long, narrow space between the mill tables and the motor room to put in racks where several hundred rolls may be placed. This avoids the rusting rolls get when stored outdoors, and at the same time makes the rolls particularly accessible, as they are under the same crane which is used in placing them in the mill.

Two operators control the main and auxiliary drives in the blooming mill. The roller controls the setting of the rolls and operates front and back mill tables by



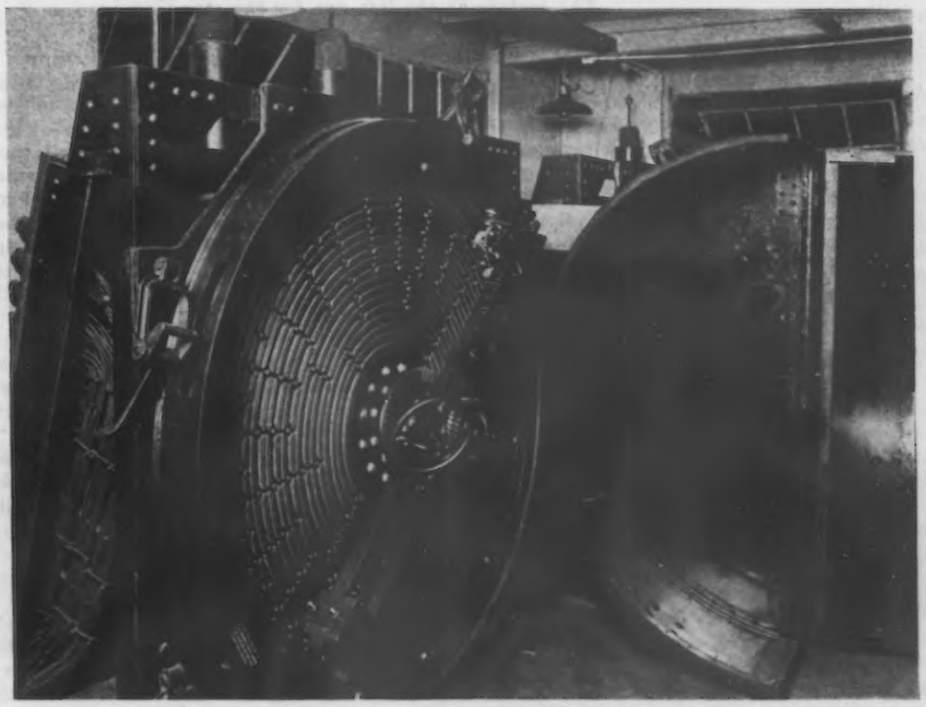
Finishing Stand of the 52-In. Beam Mill, in Left Foreground. Near extreme right is the intermediate stand, 210 ft. away. In right foreground is the pulpit for the finishing stand. Against the wall is the roll storage. Back of the wall is the motor room

hand master-switches. By means of a foot master-switch he controls the speed and direction of rotation of the reversing motor. The roller's helper operates the approach table for the mill. During the rolling of the ingot, he controls also the electrically-driven manipulators.

Roughing and intermediate mills have automatic screw-down devices. These permit one man, using a single master-switch, to operate the three screw-downs, which automatically stop at predetermined settings by means of a specially designed limit switch. Through similar automatic control, proper speed relations are obtained between the motors driving the main and the edging stands for any conditions of drafting. The standard foot master-switch enables this same man to control the speed and direction of rotation of both mill motors.

Owing to the ease with which this man can set the screw-downs and control the main motors, he is able also to run the approach table and the front and back tables, and to operate the valves controlling the cooling water for the rolls and the steam jets for removing scale. This man controls thirteen operations during the rolling of each beam.

Since the drafting follows a predetermined schedule, and the roll settings are made automatically through an electric limit switch control system, a product is obtained which is free from the internal rolling stresses sometimes caused by irregular drafting. From the time the bloom leaves the bloom shear until the finished



Limit Switch Used in Connection with Automatic Control for the Intermediate Stand of the 52-in. Mill. This is set for the succession of reductions to be made on the mill and thereafter automatically controls the screwdown for both horizontal and vertical rolls

beam is delivered from the finishing pass, all operations are controlled by four men.

Automatic Setting of Screw-Downs

One of the most interesting features of control of the mill lies in the automatic devices for adjusting the position of the rolls for successive passes. There are in the pulpit of the roughing set three large spiral limit switches intricately wired and connected with the various control units. These are set in advance for each section which is to be rolled. They automatically synchronize the movement of the three pairs of rolls in the stand such that the proper drafts are taken in the successive passes. A similar equipment is used in the intermediate set.

As the rolls are worn in use many of them are dressed to take care of sections of less depth. It is reported that there has been a surprising absence of trouble from bearings since this mill was started. None of the roller bearings has had to be changed, largely because they were designed with ample overload capacity.

Automatic forced grease lubrication is applied to all horizontal roll necks, as well as to vertical rolls, and is also widely applied to tables and manipulators. In addition, oil circulating systems supply all mill pinion lubrication, as well as a large portion of the table system.

In THE IRON AGE of June 23, 1927, page 1815, was published a brief account of the new Homestead structural mills, primarily from the electric side. This gave many details of motor speeds, motor-generator flywheel sets, and other particulars it is not necessary to repeat here.

Handling Steel In and from the Mill

In laying out the mill it was found that, in spite of the 2000 ft. of length available for the entire plant, it would not be possible to have a long enough run between stands to permit bars to be rolled back and forth in one and then in the other without interference. Hence, between the roughing set and the intermediate set there is an offset of 11 ft. 3 in., in which bars are transferred sidewise before entering the intermediate stand. The opinion is expressed by the engineers that, although this move was forced by conditions, it was one which would probably be repeated in a subsequent design, even if the conditions did not require it. This is because the narrow transfer does not interfere with rolling in either set and has the advantage of bringing the sets closer to each other.

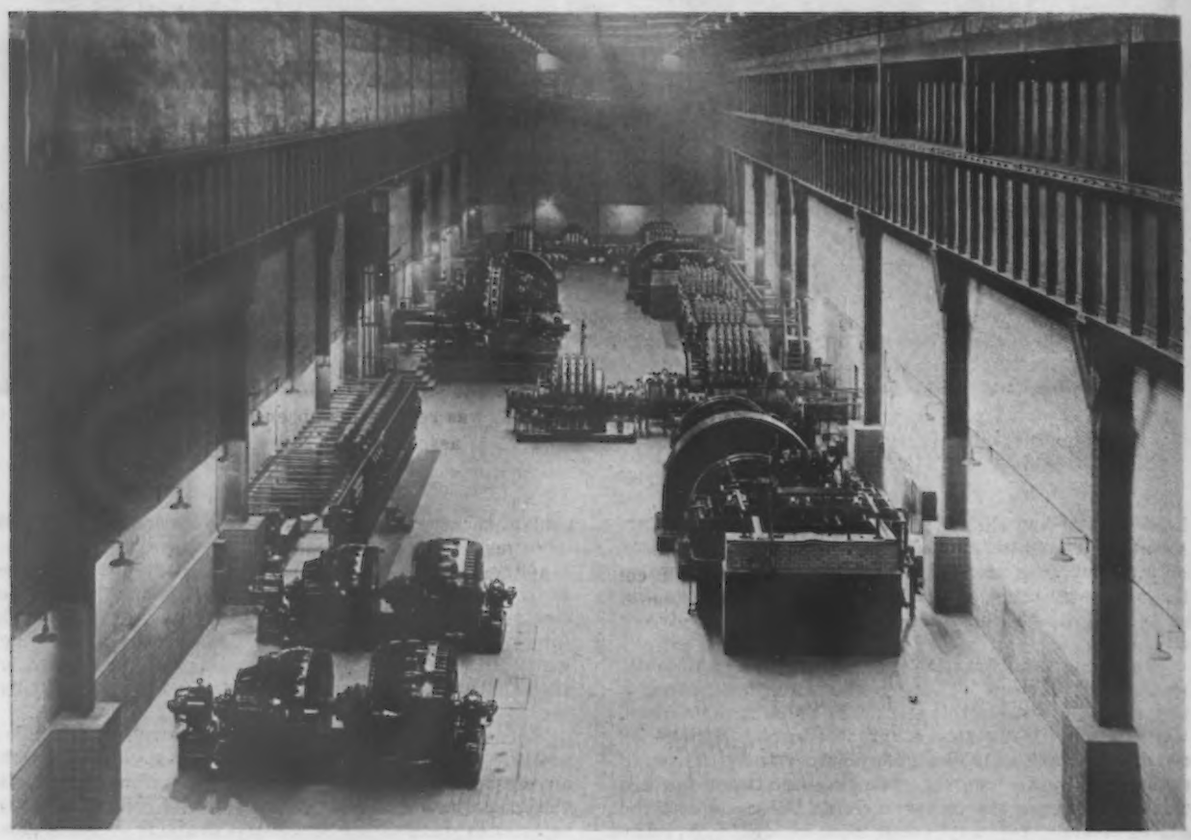
Beyond the long transfer to the hot saw is a hot bed occupying a space about 100 by 250 ft. This is in three independent sections, each some 85 by 100 ft., permitting great flexibility in handling the product. Alongside the hot bed is a roller straightener for the smaller beams and two gag presses for the larger beams. Two cold saws are provided also.

Shipping of the product takes place in a wide bay running at right angle to the length of the mill, and covering also the stripping floor of the new structural mill to the south of the H-beam mill. This bay has three 20-ton cranes of unusual design. Bars come from the mill in an east and west direction. For shipping they have to be turned north and south, or through 90 deg.

Each crane has a turntable on its trolley, which is operated from the cab and which carries a long spreader arm. At each end of the spreader arm is a separate hoist of 10 tons capacity. These may be operated either independently or in unison. For handling the big product of the mill they are operated, of course, in unison. One great incidental advantage of this equipment lies in the fact that the trolley may be run over to one end of the bridge, with the spreader parallel to the bridge, thus making it possible to pick up as much as a 10-ton load in the adjoining bay. The design is so rigid that such a load at one end of the spreader does not upset the equilibrium of the unit.

Storage space for stock is provided in adjoining bays, 3.7 acres being available under cover for this purpose.

Between the blooming mill and the roughing stands is a transfer whereby hot steel may be shunted off to other operations during the time of roll changes in the 52-in. mill. From the transfer the blooms pass upon a pivoted roller table which may be swung through about 30 deg., thus delivering the blooms upon the approach table to a wheel-blank cutting machine. Here rounds



Motor Room for the Standard Beam Mill and the H-Beam Mill. The motors and motor-generator sets for the latter are at the right. At the far end is the blooming mill motor, with the others nearer the reader. The motors at the left are for the standard beam mill

up to 15 in. diameter are cut off to such length as may be required for the wheels being made at the Schoen Steel Wheel Works, where these blanks are sent.

Between the pivoted roller table and the cutting machine is a further detour, by means of which slabs rolled in the blooming mill may be taken off and shipped to a plate mill at some distance. For this purpose the slabs have to be reheated, of course.

Within the area of the new mills were several old boiler plants serving these several mills. All of these were dismantled and taken out, to the number of more than 100 boilers. Ten waste-heat boilers were installed in connection with open-hearth plant No. 4, for heating and other purposes around the mill. Power, however, is derived now from the new turbo-generator across the river.

The Homestead works organization was responsible for the remarkable speed with which the entire construction program for all the new mills was carried out, while successfully meeting the requirement that none of the product of the old mills should be lost. The Homestead organization is also to be credited with the complete design of the 52-in. Carnegie H-beam mill and the novel features of roll design used in this mill.

Urges Curb on "Price Hammering"

Chamber of Commerce of United States Adopts Resolution Favoring "Firm Bids"—Wider Knowledge of Production and Distribution Data a Need of Industry

At the meeting of the manufacturers' group of the Chamber of Commerce of the United States in Washington last week two resolutions were adopted with a view to establishing more "teamwork" in manufacturing and industrial expansion and eliminating "price hammering and price cutting." Both were introduced through L. S. Horner, president Niles-Bement-Pond Co., New York. The first resolution, noting the rapid growth and tremendous development of the nation's industries, accompanied by excessive productive capacity in many lines, called for knowledge of the true cost of production and distribution, based upon uniform cost accounting for a given industry, and the necessity for wide publicity through trade associations of reliable statistics covering current facts on orders, shipments, stocks, etc. Chambers of commerce interested in promoting new industries for their communities were asked to consider such current economic facts before encouraging development of additional capacity in any given industry.

The second resolution, pointing to prevalent "price hammering by buyers and price cutting by sellers," affecting profits and stability of many businesses, declared for a system of firm prices and bids, which, it was stated, would not lessen competition and would be a benefit to the public. Trade associations, chambers of commerce and the business press were urged to use their influence to create a widespread sentiment in favor of such prices and bids, which would not be reduced once they were submitted.

In discussing these resolutions, Mr. Horner declared that there is a "crying need for outstanding leaders to step into the open and lead the way to better, saner and more honorable methods of conducting their business and education of executives not so well informed."

Purchasing agents who engage in the practice of "pounding" down prices were criticized by M. L. Lissberger, president Marks Lissberger & Son, Inc., Long Island City, N. Y. He said that, by beating down prices of products that they purchase, the prices of their own products are reduced and that therefore the practice reacts to the detriment of their own industries. He also urged trade association executives to obtain and distribute more business facts as a means of preventing the hammering down of prices.

Business Statistics Defended

In a spirited reply to one delegate, who objected that trade statistics do not mean anything except time and expense, E. F. DuBrul, general manager National Machine Tool Builders' Association, Cincinnati, stoutly maintained that such facts are absolutely essential to the intelligent conduct of business, but that one difficulty is that some executives do not use them after they are supplied. In discussing price cutting, Mr. DuBrul complained that there is a lack of courage on the part of sellers in maintaining their figures, with the result that profits are brought down. George D. McIlvaine, National Pipe and Suppliers' Association, Pittsburgh, said that the problem of distribution is becoming more intense each day, but that men are getting into distribution who are not qualified by either education or capital.

A paper on "Labor Conservation—Teamwork for Lower Costs of Production," prepared by C. S. Ching, president American Management Association, New York, was read in his absence by W. J. Donald, director of the association. New machinery and improved methods of production were declared to be the one thing which has raised man from a mere existence level to economic independence. Those who would limit or restrict this development, it was said, are fighting against industrial progress and striking at the basic cause of the present high standard of living. Comparative freedom in the United States from opposition to improved methods of production on the part of both employees and management was named as one of the most important factors in the industrial supremacy of this country. The favorable attitude of both workers and executives, their teamwork and confidence in each other, was declared to be a necessary factor which had developed improved methods of production and benefited wage earner, management, stockholders and the general public through greater output of goods and cheaper costs.

An examination of the census of manufactures was said to show conclusively that the per capita income of the wage earner has increased in direct proportion to the per capita value of goods produced. One of the important reasons for the relationship between workers and management was declared to be the lack of class consciousness in the United States.

"Our industrial organization is unusually democratic," it was pointed out. "The wage earner of today is the industrial leader of tomorrow. . . . As a result, management cannot be regarded as set apart from the rest of the organization. It is no super-imposed group. Its ranks are being continually filled from every position within industry."

Denounces Government Muckraking

In an address at a general session of the chamber, William E. Humphrey, chairman of the Federal Trade Commission, strongly denounced Government muckraking investigations based merely upon the hope of finding something scandalous or reprehensible. Mr. Humphrey said that he is utterly opposed to any investigation by the Federal Trade Commission that is not based upon alleged violation of the law. Constructive methods by which the commission is cooperating with business to eliminate abuses and unfair trade practices were outlined by Commissioner Humphrey.

Addressing the foreign commerce group, Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, Department of Commerce, spoke of foreign trade combinations and in the course of his remarks said that the cartel has its distinct limitations and by no means affords the panacea which had been confidently expected of it. The international steel cartel was cited as an example in proof of his statement. He said, however, there is need for collaboration in the furthering of uniform commercial legislation, for the interchange of statistical information along mutually helpful lines, etc., in advancing the standards and possibilities of the world's commerce.

Era of Large Unit in Business Only Begun

The outpouring of restrictive and regulatory laws from American legislatures was subjected to attack by Silas H. Strawn, chairman of the board of Montgomery Ward & Co., Chicago, and president of the American Bar Association, at a general session. He predicted that the era of the big unit in business is only beginning.

"Commencing with the amalgamation of the constituent companies into the United States Steel Corporation, in 1901, the last 25 years may be known as the age of the big unit," said Mr. Strawn. "Competition and economy have made necessary the creation of big units in almost every industry and business. I predict that the age of the big unit has only just begun and that in the future the problem of our Congress and our legislatures should be, and let us hope it may be, not how combinations of capital and labor may be disintegrated and destroyed, but how they should be regulated and controlled so as best to serve the people."

International Trade and Finances Discussed

New problems, national as well as international, confronting the United States as the most productive country of the world were discussed at the annual dinner last Thursday evening, which was attended by some of the country's most distinguished industrialists and business men. Owen D. Young, chairman General Electric Co., presided. Among questions dealt with were how foreign countries are to pay for the growing volume of supplies purchased in America and how the United States is to maintain and control its growing productive energy.

A warning that this country cannot go on indefinitely receiving yearly an increasing amount of interest and sinking fund payments on its loans and investments and maintain its present tariff policy and export trade was given by Dr. Alberto Pierelli, Milan, Italy, president International Chamber of Commerce. He said, however, there would appear to be a number of compensating influences, such as the rising standards of living in this country and throughout the world. Sometimes, also, new scientific discoveries revolutionize the course of economic development, it was pointed out. Nor should the influence incident to the development of new territories be disregarded, Doctor Pierelli said.

Better Control of Increasing Production Urged

Adequate control of the economic thunderbolt of increasing production unloosed by industry was put forward by Lewis E. Pierson, retiring president of the chamber, as the overshadowing problem of business. He said that the nation has a new problem before it and must prove that production is its servant and not its master. It must, he said, demonstrate that it has the will and the skill to control the machine it has created. Closer cooperation on the part of business, labor, agriculture and finance to accomplish this purpose was predicted by Mr. Pierson. He foresaw teamwork on the part of these interests lifting the fear of unemployment and suffering from the minds of those who toil, permitting the wheels of industry to turn with increasing effectiveness "to bring more and more of the comforts and even the luxuries of life to all who contribute to the productive power of America and remove the threat of an unused surplus from the nation that has staked its economic future on the doctrine of increasing production."

Joseph H. Defrees Elected Chairman

Following the conclusion of the convention, the board of directors on Friday elected officers for the ensuing year. Joseph H. Defrees, lawyer and business man of Chicago, was chosen as chairman of the board, succeeding Judge Edward B. Parker. William Butterworth, president Deere & Co., Moline, Ill., was elected president, succeeding Lewis E. Pierson. Other officers elected were: Vice-president Eastern division, Alfred J. Brosseau, New York, president Mack Trucks, Inc.; vice-president South Central division, Robert R. Ellis, Memphis, Tenn., president Hessig-Ellis Drug Co.; vice-president North Central division, Robert P. Lamont, Chicago, president American Steel Foundries; vice-president Western division, Paul Shoup, San Francisco, executive vice-president Southern Pacific Co.. Frederick J. Haynes, Detroit, chairman of the board Dodge Brothers, was reelected a director.

Purge Business of Corruption, Resolution Urges

The outstanding resolution, following the lines of the keynote address of the meeting by Judge Parker, while recognizing the general integrity of business, urged that it be purged of commercial and political corruption and other dishonest practices. It reaffirmed the chamber's principle that "business should render restrictive legislation unnecessary through so conducting itself as to deserve and inspire public confidence." Another resolution opposed government in business that can be successfully undertaken and conducted in public interest by private enterprise. In a resolution concerning the Federal courts, the chamber deplored efforts by the legislative branch to usurp or limit the functions of the judiciary which, it was said, must result in disaster. In passing upon taxation, a resolution urged reduction of the corporate income tax to not more than 10 per cent, the elimination of the war excise taxes on particular business and repeal of the estate tax; another resolution urged greater efficiency in the administration of Federal taxation. Opposition to Government operation of the merchant marine was expressed and approval given of pending legislation for the encouragement of private shipbuilding and operation through loans. Opposition also was reiterated respecting provisions of the Jones-White bill, which authorize the Shipping Board to include in its activities marine underwriting, which was held to constitute an unnecessary and unsound abridgment of private enterprise. Amendment of the national defense act to permit the placing of educational orders with industries was urged.

Collective buying of imported raw materials not available in the United States was sponsored, with advocacy of an amendment to the Webb-Pomerene act to this end. It was held that this would assist in releasing American buyers from the grip of foreign monopolies. Industrial information was recognized as being necessary so that business may be conducted intelligently; the gathering and distribution of such material, bearing upon true costs of production and distribution based upon uniform cost accounting, was approved.

Appreciation and support were given the policies of the Department of Commerce for the promotion of commercial aviation, as giving private initiative encouragement toward building of air commerce upon a sound basis for future expansion.

Furnace Operation; Quality Control

Open-Hearth Men Discuss Their Problems at Youngstown Meeting — Impurities in Scrap Charged Cause Much Trouble

THREE half-day technical sessions of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers were held at the Hotel Ohio, Youngstown, on May 3 and 4. More than 80 open-hearth superintendents and others interested in open-hearth matters were present. Last week, pages 1317 to 1320, the general features of the meeting were covered, including the discussion of the first morning's session, which was devoted to matters relating to the construction of open-hearth furnaces. In the following paragraphs are the discussion of furnace operation, which formed the topic for the afternoon session on May 3, and of quality control in producing steel, which was discussed on the morning of May 4. There were no set papers at any of the sessions. Many men participated on each topic.

Consideration of Furnace Operating Results

AUTOMOBILE scrap and some machinery scrap contains ingredients which may run right through the bottom of the furnace within two or three days, in the opinion of John H. McDonald. It is of such a character that it cuts through the pan. This seems to be the general consensus of opinion as to this type of scrap, which is reaching the mills in great quantities.

Scrap foremen and others handling scrap are given bonuses, in several plants, for all of the brass and lead, nickel, aluminum, babbitt, zinc and other impurities which they separate out from the scrap. As a result of this practice, which gives the foremen as much as $60 to $75 extra a month, Henry A. Young reports very little trouble from dirty scrap at Allegheny Steel Co.

Effect of Impurities in Scrap

Chromium in scrap results in a slag which is hard to shape up, according to J. M. Hughes, Sharon Steel Hoop Co. Nickel does not seem to give trouble, but brass, aluminum and lead do. Brass, babbitt and other impurities have been giving trouble at the Wisconsin Steel Co. in furnace practice, but Mr. Ramsey said that no detriment to the quality of the product had been observed.

Nickel at about 0.1 per cent was reported by R. S. Simmons, research manager Pittsburgh Steel Co., to result in a heavy coating of scale, especially on strip steel. Tin oxidizes in the bath. The foreman of the Pilger mill refuses to accept a heat of this character. It will not pierce and, in one instance, such a heat could not be rolled on the 28-in. mill. The influence of the tin inclusions was such as to raise a 0.14 per cent carbon heat from the normal 48,000 or 52,000 lb. to the square inch to 68,000 lb.

Galvanized sheets are charged on top of the upper layer of scrap at the Edgewater Steel Co., for the purpose of allowing the zinc to burn off. This material has been known to run through the bottom of the furnace and pile up below the tap hole. Babbitt runs through the furnace in a similar way, said Frank B. McKune, open-hearth superintendent Steel Co. of Canada. It is regular practice at that plant to prepare all the scrap before it is put into the furnace. As much as 500 lb. of babbitt has been gleaned from a drag of ten cars of scrap. This material includes about 85 per cent of lead and 8 or 9 per cent of antimony.

How Lead Acts in Bath of Steel

Lead goes at once to the bottom of a furnace because of its greater specific gravity, and lead oxide does the same, according to G. D. Tranter. Brown fumes coming off the furnace bottom are an indication that lead is present there. Journal brasses in the scrap contain some 15 per cent of lead. When this trouble is encountered it becomes necessary to wash about 6 in. off the bottom of the furnace and remake the bottom with fresh magnesite. Nickel, chromium and aluminum cause little of this trouble, but have their effects on the quality of the steel. Any lead above 0.008 per cent in the bath will tend to cause trouble, making small checks show up on bars, and a lot of small scabs. One source of lead is the heavy paint existing on some bridge scrap. Sometimes this lead oxide coating is as much as ¼-in. thick.

High copper content gives much trouble in forging steel, reported C. C. Wales, superintendent open-hearth and blooming mill, Otis Steel Co. For this purpose the copper must be held under 0.04 per cent. He stated that both copper and nickel go out with the metal, while lead and chromium stay in the furnace. Hence, the two groups must be considered separately. T. T. Scott, Sheffield Steel Co., expressed the opinion that nickel and copper do no harm if under 0.20 per cent.

Reclaiming Valuable Non-Ferrous Metals

As the secondary metals under discussion are much more valuable, pound for pound, than the steel scrap, Dr. Thomas T. Read, secretary of the committee, suggested that perhaps an economic solution might come, through the scrap dealer sorting out the non-ferrous items. Selling this at the higher price which it com-

Unusually Broad Participation in Deliberations

MEETINGS of men earnestly debating the means of improving the technique of their work have become common in the United States in recent years. But the semi-annual gatherings of the open-hearth committee are perhaps unique in the extent to which nearly every member gets his day in court. Forty-two different men are quoted in our report of the Youngstown meeting—just two-thirds of the number of active steel works men present. Some of the others spoke, also, but limitations of space have held us to those mentioned. And the way in which differences of opinion were ironed out in the meeting, largely through the leadership of the chairman, holds happy augury for the future work of the committee.

mands would be looked to to compensate for the cost of labor involved. But several speakers stated that the cost of separating some of the metals in that manner would be greater than the selling price of what might be recovered.

Scrap dealers already are worrying about the rejection of scrap carrying large quantities of impurities, Mr. Reinartz said. "What if everybody starts to reject automobile scrap?" Mr. Ramsey suggested that it might be expressed as the sense of the meeting that automobile scrap be rejected in all cases except where it is bought as such. If such a standard specification be made, and everyone would live up to it, this might stop the mixing of automobile scrap with scrap of a cleaner grade. Some one amplified this by suggesting that no one accept automobile scrap except in carload lots. A single piece of such scrap in another kind of scrap, even though some of the scrap had been unloaded and used, should be cause for rejection of the remainder.

Doctor Herty explained that the kind of steel being made has an influence on the effect of the deleterious element. For instance, with steel of 0.60 per cent carbon, as little as 0.03 per cent tin would be likely to cause trouble. But with 0.08 per cent carbon tin may be accepted up to 0.20 per cent, without reason to apprehend trouble.

Regarding copper-bearing steels, the Allegheny Steel Co., which has been making this grade for years, formerly had to add considerable copper. It now has to add only half as much, or even less, due to what the scrap already contains. It is necessary to run a preliminary test, to ascertain how much copper to add, because the residual in the bath varies so much. This is at about 0.10 to 0.15 per cent at present.

Control of Furnace Temperatures

Using a Venturi-type part at the incoming end of the furnace, with a cross section of 900 sq. in., the Steel Co. of Canada makes it a practice to set the damper as experience has dictated and then not to change it during the run. Gas meters are used at each furnace of the Republic plant, so that the flow is known and can be controlled.

With the Isley control method on 115-ton furnaces at the Ashland plant of the American Rolling Mill Co., a pyrometer is placed at each end of the furnace and reversal is made at a predetermined temperature in the flue. There is a Brown instrument set to ring a bell when this temperature is reached. An indicating pressure gage in the downtake measures the stack draft and the pressure of the incoming air. A variable-speed fan is connected with a rheostat set to give the draft and pressure wanted. Using natural gas, the consumption is 80,000 to 85,000 cu. ft. an hour during the melting period, about 60,000 cu. ft. on the lime boil and 55,000 to 60,000 cu. ft. for finishing the heat.

Fuel Savings Shown in Controlled Furnaces

At the Middletown plant of this company pyrometric controls are placed on various parts of the furnace. A fan is used on the air inlet, to know how much is going in. Carbon dioxide in the slag pocket ranges from 17 to 18 per cent, with perhaps 2 per cent of oxygen. Coal consumption is about 600 lb. to the ton of steel. Heats are being made in 12 hr., which is a bit better than the normal run on ingot steel. It is found necessary to keep changing the fan speed throughout the progress of the heat, to obtain perfect combustion conditions. Using producer gas, the air blown in ranges from 4500 to 7000 cu. ft. a minute.

Savings of about 3 gal. of oil to a ton of steel are attributed to pyrometric control on Laclede Steel Co. furnaces, by John W. Gething. Positive pressure is carried on both the uptake and the downtake. This does not result in blowing out at the doors, except for a small amount at the last door near the outgoing end.

Refractories for Various Services

Burnt magnesite is used on the bottoms and a 2-to-1 mixture of dead burnt and raw dolomite on the banks and sides of the Granite City furnaces. Major James W. Mills, open-hearth superintendent, expressed a liking for the domestic grades of magnesite. For a hole, he uses a mixture of ground slag and magnesite.

Patches are made with magnesite at the Pittsburgh Crucible Steel Co., as reported by David G. Baxter, open-hearth superintendent. Different kinds of prepared refractories have been tried for bottom repairs. For washing out high bottoms, Magnifer is used. T. T. Scott, Sheffield Steel Co., stating that his practice is hard on banks and bottoms, uses some magnesite with raw dolomite. On the other hand, C. Foster, open-hearth superintendent American Steel Foundries, East St. Louis, Ill., uses no magnesite except on the Sunday overhauling. Burnt dolomite is used regularly. He considers the domestic magnesite very satisfactory.

Preference was expressed for raw dolomite and magnesite, over the patented materials, by W. T. Kilgore, open-hearth superintendent Erie Forge & Steel Co., "because the cost is less than half as great." He uses as little magnesite as possible, for similar reasons, but closes the taphole with Austrian magnesite.

Each Type of Refractory Has Its Use

Roasting the dolomite in the plant was reported by H. B. Hubbard, Inland Steel Co., and R. L. Leventry, Republic Iron & Steel Co. Mr. Hubbard said that his consumption of dolomite averaged 62 lb. to the ton of steel in 1927, and of (foreign) magnesite, 2 lb. Mr. Leventry uses foreign magnesite for bad holes, and is experimenting with Canadian magnesite. He uses some of the patented materials, believing that each type of refractory has its own use, which it can fill better than other materials.

Austrian magnesite is used for bad holes and Kendolag and Magnifer for slag lines at the Corrigan-McKinney plant. L. E. Yost, open-hearth superintendent, stated that a change from 42 per cent to 65 per cent pig iron in the charge involves a change from 2 per cent to 12 per cent of ore in finishing. And it must be remembered that the higher the metal charge the greater will be the refractory costs.

How Much Do Tapholes Grow?

Considerable discussion was evoked by the statement that the taphole grows as heat after heat is run out through it. W. F. Davis, Youngstown company, Inland Harbor plant, said that a 5-in. hole will take out a 106-ton heat in 8 or 9 min. This time is reduced to 6 min. when the taphole has gone up to 6 or 7 in. in diameter. Frank A. King reported that on the big furnaces at Weirton a 6-in. hole cuts to 7 in.

On the other hand, Mr. Kilgore stated that a taphole laid up with magnesite does not grow. William Herman, superintendent steel plant Keystone Steel & Wire Co., Peoria, Ill., uses a special form of magnesite tile for the taphole when rebuilding a furnace. This gives a hole 6 in. in diameter and 13 in. long, which lasts about 70 heats. Then he relines the hole around a 5-in. pipe. At the Donner Steel Co. a 6-in. pipe on 100-ton heats lasts about 30 heats. At Laclede Steel Co. a 7-in. pipe is used on 80-ton heats, lasting for about 35 heats. With a 5-in. or 6-in. pipe, only 15 to 20 heats are obtained from each pipe by the Andrews Steel Co., E. A. Smith reported.

Low-carbon steel is particularly hard on the taphole, according to several speakers. With the big furnace and bifurcated spout at the Republic plant a large hole is needed. Mr. McCutcheon reported "no luck with tapholes." He uses 6-in. pipe on soft heats. A long discussion followed as to heats breaking out at the taphole and spurting over the top of the ladle when raw dolomite is used for the taphole. Burnt material as a lining, on the metal side, was said to obviate this trouble.

Aids in Bottom-Making Time

Using a Blaw-Knox bottom-making gun, the average time for this process at the Middletown plant was reduced from 49 min. to 31 min. A sloping backwall, according to G. D. Tranter, needs a dolomite gun to keep it in shape. Also, if the slag line begins to cut, near the end of a heat, the dolomite gun is brought up to hold it in place.

A similar view was expressed by Henry A. Young, who believes that the use of the gun keeps the banks in better shape than is possible by hand. This innovation has eliminated the services of many third helpers. At the Bourne-Fuller Co., one man to the furnace

has thus been displaced, while the banks are better maintained, and with less material. For a plant of six to eight furnaces, the gun permits the crew to be only two men to the furnace, with four men in the pits, according to Mr. McCutcheon. It simplifies the hard job of bottom making, and does it with the least effort.

Advantages of Sloping Backwalls

Sloping backwalls were characterized by Robert L. Cain as a money saver. After two years of use, he said, no brick have had to be replaced, against a repair job, previously, after every 30 heats or so. Similar results were reported by R. L. Leventry, who stated that he had never had to shut down to make a backwall repair, with sloping backwalls. After a run of some 275 heats the chrome brick at the slag line have to be replaced. He called the slope a "good improvement."

While H. B. Hubbard averred that the sloping backwall is worth while on account of saving delays, Mr. McCutcheon sounded a note of warning. The roof over the slope becomes a problem, he said. It cuts badly near the skewback line, where the roof has been widened from 15 ft. 6 in. to 19 ft. An incidental advantage was cited by G. D. Tranter in connection with the frontwall. An extra 10 to 15 heats may be obtained from it, when a sloping backwall is used, by not repairing the frontwall as a matter of routine when the furnace is off for backwall repairs. On this point, Mr. Cain and Mr. Kitto both said that the sloping backwall has doubled the life of the frontwall.

Speaking on the proper grade of sand to use for the bottom of an acid furnace, R. A. Mercur, Jr., assistant superintendent steel mills John A. Roebling's Sons Co., Roebling, N. J., stated that his company can dig the sand out from under the property. He uses a mixture of two grades, in the proportion of six parts of the white local sand to one of a red sand. Analyses of the two sands were given, as follows:

	White Sand	Red Sand
SiO_2	97.84	84.36
Fe_2O_3	1.70	3.59
Al_2O_3	0.68	8.39

Session on Control of Quality in Steel

CAUSE and cure for blisters in full finished and galvanized sheets was the opening topic of discussion at the third session of the conference, Friday morning, May 4. J. A. Durfee, metallurgist Weirton Steel Co., expressed the opinion that blisters on galvanized sheets are caused mostly in the annealing process. Hydrogen itself does not expand blisters, but moisture which has crept in does. Water vapor expands from water to the extent of 2240 times its original volume, against only two volumes for hydrogen. It is necessary to hold the sheets in the water vat long enough after pickling to be sure of getting the surface clean. Holding them too long, however, is likely to give trouble. It is a question whether sheets should not be dried thoroughly, over a coke fire or otherwise, before galvanizing.

Too Little Top Cut Off the Ingot

Lack of sufficient cropping of the ingot was mentioned by L. E. Yost as a cause to which trouble may be attributed. E. A. Smith made the same observation. He suggested that an increase in the amount of lime in the heat might help this condition, as a slag which is too thin will not give good surface results to the steel. He reported a marked difference in blisters in the surface, between steel which had been made with 12 per cent of limestone in the bath and that which had had only 10 per cent.

Opposed to this large use of limestone, W. F. Davis reported using only 7 or 8 per cent with a charge of 38 to 42 per cent of pig iron. This quantity of stone appears sufficient to give good heavy slags, but, of course, the proportion must be related to the amount of iron charged. Howard McClelland stated that there are more gray sheets resulting from killed than from rimmed steel. Much trouble is experienced in the pickling and some trouble from small blisters. In his practice the limestone is 11 to 12 per cent.

Pickling Process Blamed

Many very fine blisters, reported by the chairman from the Middletown plant, were attributed to taking too long a time in the pickling process. Certain mechanical changes were being made in the pickling department, resulting in the operation stretching out to twice the normal time. When this was speeded up again the blisters were got rid of.

Sheets with the most inclusions are, in his opinion, the ones showing the greatest tendency to blister. With 0.08 to 0.10 per cent carbon rimming steel, there are three or four times as many blisters in the top part of the ingot as elsewhere. Practically none are found in the bottom. Low-temperature annealing, also, seems to have a greater tendency to result in blisters than when the temperature is higher.

Sloppy-Working Furnace a Common Offender

Most of the trouble of this character, according to C. C. Wales, is due to slag inclusions. Somewhat the same idea was expressed by N. F. Egler, who laid the source of the trouble to a sloppy-working furnace. Little such trouble is experienced when the furnace is working sharply. Consequently he believes it good practice, when the bottom gets dirty, to take that furnace off of such particular products as sheet bar. Blisters will be produced if the furnace is ored too close to tapping time. Trouble may be caused by the furnace melting the charge too soft, if there is high-silicon pig iron in the mixer.

Blisters, according to Mr. Egler, come from a sloppy furnace because of slag inclusions. There is a greater amount of oxide present than on faster-working furnaces. There are more cold heats and as a result larger skulls left in the ladles. High-carbon steel can be made satisfactorily on a slow-working furnace, but it is not feasible to make low-carbon steels on such a furnace, if it is nearly ready to go down for general repairs.

Major James W. Mills placed the seat of trouble from blisters squarely in the open-hearth department. It is essential to have a good slag on the bath. There is trouble if the slag is too thin and trouble if it is too thick and lumpy. His plant uses about 8 per cent of limestone, or a corresponding amount of burnt lime, but with only 20 per cent or so of hot metal. He prefers metal with from 1 to 1¼ per cent silicon and 1½ per cent manganese, and states that 16 to 18 per cent silica in the tapping slag makes for good steel.

Feeding ore into the furnace within 45 or 60 min. of tapping was condemned by J. M. Hughes. With rimming steel he recommends a drop of from 2 to 4 in. on the ingot, if trouble is to be avoided.

Placing Responsibility for Seams and Pits

Soft-melting heats are charged with most of the responsibility for surface trouble, by J. D. Walters, assistant open-hearth superintendent, Lukens Steel Co. Such defects as seams, pits, etc., in plates (his company does not make sheets) go up from a normal 5 per cent to as much as 15 per cent under these conditions. Trouble is caused also by low-silicon iron—around 0.7 or 0.75 per cent—because it is difficult to get action in the bath. Above 1 per cent of silicon—or, better, 1¼ per cent—the action is good. He recommends the same 45 to 60 min. leeway, after the last ore addition before tapping, as did Mr. Hughes. He believes that fire-clay in the spouts and ladles is sometimes the cause of trouble, through loosening up and getting into the steel or slag.

Four main sources of trouble from blisters were given by G. D. Tranter. First he mentioned a larger skull in the ladle. Over-oxidized steel was the second item. Too low a manganese was the third, as 0.35 to 0.45 per cent manganese in the steel will give less trouble, with carbon from 0.08 to 0.12 per cent, than if the manganese is below 0.30 per cent. His fourth cause was melting the charge soft and then repigging. If, however, the recarburizing process is carried be-

yond the immediate need, and then the charge is ored down a bit, less trouble ensues.

Urges Omitting Use of Ore

Avoid the use of ore altogether and thus avoid trouble, was the counsel of F. B. McKune. It is his practice to lower the carbon content through reaction induced by stirring the furnace continuously with rods, from as high as 1.25 per cent carbon down to 0.6 per cent.

Good forging steel of 0.08 to 0.20 per cent carbon can be made on a slow-working furnace, in the opinion of Samuel B. Muir. Charles H. Moreland, however, states that special steels should never be made on a slow-working furnace and that at least 1.35 per cent silicon in the iron should be required for them.

Better results from iron high in phosphorus—1.75 per cent in place of 1.15 or 1.20 per cent—were reported by W. F. Davis. This iron gives a more fluid slag and results in the production of better plates, in which the phosphorus is up to 0.035 to 0.038 per cent. By-product gas gives more of a tendency to the furnace to foam than any other fuel, according to Howard McClelland. He stated that there is no sure cure for foaming. Several palliatives are available, but the condition always comes back.

Improvement of Pouring Practice

Practice seems to be tending toward using as small a nozzle as is practicable to pour the heat. Major Mills recommended opening up the nozzle as easily as possible, to avoid splashing. If there is a tendency to spray, the nozzle should be lengthened. In this connection C. B. Collingwood reported that he had just ordered some new nozzles 15 in. long in place of his standard 12-in. length.

Poor success in pouring small ingots from the top was reported by J. D. Walters. With molds measuring 7 x 14 in. and 9 x 14 in. there was so much splash as to give a bad surface. Hence a section of stove pipe was used, running down to near the bottom of the mold, through which the steel was poured.

Reporting upon the use of a square nozzle opening, in place of the customary round, Kenneth C. McCutcheon stated that the 1½-in. size is ideal for narrow molds. He uses a long nozzle with the sides of the square set parallel to the sides of the mold, and can pour an ingot of 11,500 lb. in 87 seconds. On soft steel, however, this nozzle cuts away quite rapidly, resulting in pouring this size of ingot later in 60 seconds or less.

Pouring with Two Nozzles

Use of two nozzles to the ladle, each with a 1-in. hole and separately controlled, was reported by F. B. McKune. He is getting down to as small a nozzle as he can use. He pours two ingots at once, thus minimizing the time of pouring the heat, and reports getting a better surface with these small nozzles. There is almost no trouble experienced from leaky nozzles or running stoppers. The time of pouring increases from 2 min. at the beginning to 2 min. 35 sec., as the steel gets colder, at the end of the pour. It takes from 47 to 50 min. to pour 80 tons of steel in this manner, with the nozzles at 37-in. centers. He is trying to get away entirely from the nuisance of bottom pouring.

Setting the nozzles straight, so that the stream will not strike the side of the mold, and then getting the nozzle centered over the axis of the mold was recommended by G. D. Tranter. The molds must be clean and warm for best results. Samuel B. Muir reported that nozzles ordinarily cut as much as ¼ to ¾ in. while pouring a heat.

Getting Carbon Analysis on High-Carbon Steels

To avoid adding pig iron, as much as possible, it is the practice in the Donner Steel Co. plant to catch the carbon coming down. Samuel B. Muir reported limiting the anthracite additions to two bags (four points). Consequently, for high-carbon steels, such as 0.90 per cent, the furnace must be tapped at above 0.85 per cent carbon.

Quite a different practice was reported by E. L. Ramsey, who works the bath down to 0.15 or 0.18 per cent carbon and then recarburizes for all steels of under 0.50 per cent carbon. The steel is held for 10 to 25 min. after recarburizing, depending upon the size of the jigger put in. In addition, if silicon in the recarburizer is under 0.90 per cent he adds some 15 per cent silicon pig, to overcome the drop in silicon caused by holding the heat in the furnace.

Quality and Tonnage Viewpoints Differ

From the quality standpoint it is necessary, he believes, to catch some of the steels coming down. From the tonnage standpoint, however, he prefers to recarburize. He uses a 1½-in. nozzle to pour a heat of 118 tons, but has ordered 1¼-in. nozzles for trial. He believes that a higher temperature in the steel is needed if hot tops are used on the molds. For such purpose he recommends 2800 deg. Fahr. for steel of 0.40 to 0.75 per cent carbon.

Rail steel at the Inland plant is worked down to 0.15 or 0.16 per cent carbon and then recarburized. Use of a screwhead for the stopper was recommended both by W. T. Kilgore and Henry A. Young. Both have used them for years and stated that they would not go back to the pin and nut arrangement. This point of view caused disagreement from some other speakers.

Bottom Pouring High-Carbon Steel

Not very good success from bottom pouring of high-carbon steel was reported by J. D. Walters. He stated that a very dirty surface results, because of slag inclusions. Another speaker, referring to long ingots, on which sinkheads are placed, stated that with eight ingots on one bottom plate it takes 5 min. for ingots of 4 tons each and an additional 2 min. to fill in the heads. These ingots including the sinkhead are 115 in. long. Ingots are poured by this means from 13 to 30 in. in diameter, and the steel is at about 2900 deg. Fahr.

All ingots for the Pilger mill at the Pittsburgh Steel Co. are bottom cast, according to R. S. Simmons, research manager. These ingots are very small and are dead killed. The skin forms quickly, and gas is found close to the surface.

Temperature Requirements for 3 Per Cent Nickel Steel

Best results, according to Samuel B. Muir, are obtained with a pyrometer reading of about 2900 deg. Fahr., with steel containing 3¼ to 5 per cent of nickel. The hotter the steel is poured the cleaner it is. Possibly 2850 or 2875 deg. might be satisfactory.

Addition of nickel into the bath should not be too close to time of tapping. There is very little loss of nickel in the bath, as 98 per cent nickel drops only to about 96 per cent. Ingots should be left in the molds (20 x 20 in.) for about 1½ hr. Then they should be put right into a pit immediately after stripping. If they are allowed to get cold, a preliminary or warming pit should be used to bring them to a certain intermediate temperature, before charging them into the soaking pit.

All steel should be worked hot, according to L. E. Yost, so as to aid the oxides to get through the bath into the slag. The pouring temperature can then be adjusted as needed.

Hot tops of sand and a glutrine bond are made on the jarring machine at the Edgewater Steel Co. Mr. Smith reports that these are dried out thoroughly in an oven before being used. The discard from the ingot is about 10 or 11 per cent. Using bottom pour, these sinkheads have cut the pouring time from 7 min. to 5½ min.

In recognition of the efforts of the foremen and safety committeemen at the Joliet, Ill., works of the Illinois Steel Co., that company was host at a banquet, April 26, to 362 of these men, who had achieved a new record in safety measures for 1927. Last year only four lost-time accidents were recorded. Of these, three caused a time loss of more than seven days each. Nine calendar months passed without a single lost-time accident, shattering all the previous records.

Sponge Iron As a Melting Base

Recent Experience in the United States and in Sweden—Superior Workability of Steel Revealed by Tests

BY N. K. G. THOLAND*

IN recent years sponge iron has attracted considerable interest as a melting base for high-grade steels, and has also been a theme for much discussion. While the extent of the application of sponge iron is still uncertain, it has already secured a definite place in some phases of modern steel making.

At one time sponge iron was probably the only iron base in use, because, in the early days of our "iron age," it was impossible to obtain temperatures high enough to melt iron. Therefore, sponge iron—iron reduced from the ore at temperatures below the melting point of iron—undoubtedly was the earliest form in which iron was produced. Later, with the development of blowing engines, following the Catalan forge and shaft furnaces of various types, man developed the modern blast furnace, which is the main producer of iron today.

In various localities, however, interest in iron produced by "direct reduction" from the ore has persisted, and from time to time different methods have been developed and tried. However, the instances where extensive comparative tests have been made, and published, of similar steels, made with and without sponge iron, are few.

Recently sponge iron has been tried along new lines in this country, and it is the object of this article to discuss briefly such figures and generally comparative results that can be made public at this time. The meltings that will be referred to, here and abroad, were made with the sponge iron from the plant of the Hoeganaes-Billesholms Co. of Sweden. This product contains about 97 per cent Fe and a very small amount of detrimental impurities.

Red-Shortness Claimed Reduced

Since the production of sponge iron started at Hoeganaes in 1908 it has been used chiefly in open-hearth and electric steel furnaces, both basic and acid. Very early the product was tried in low and medium-carbon charges with scrap and pig iron in making steels for seamless tubes. In that application it was noticed that the melting and the refining of a heat proceeded very quickly and smoothly as compared with an ordinary, otherwise equally balanced, scrap and pig iron charge. The metal poured with a clear color, fluid and coherent. The steels produced showed marked freedom from red-shortness.

The difficult piercing operation of the tube billets proceeded with greater ease than ordinarily and with very few rejections. The amount of sponge iron used in the charge varied, and, with 7 to 15 per cent of the total iron weight of the charge was common, as little as 4 per cent is used in such steels today. For most steels, 7 to 25 per cent of sponge iron is commonly used for open-hearth charges, with 45 per cent as the maximum, while for electric furnace charges 15 to 30 per cent is not unusual, with 50 per cent usually considered as a maximum. There are steels produced from a 100 per cent sponge iron charge in electric furnaces using coke, electrodes, etc., as carburizers.

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Freedom from red-shortness has also manifested itself in the violent operations of forging and piercing to which other steels are subjected while red hot. Sponge iron steels show less cracking than other steels of good quality, and, in this connection, well-known authorities have expressed the opinion that the more elastic cohesion between the iron crystals in sponge iron steels has a definite bearing on the hot and cold working of the metal.

In the production of open-hearth and electric steels where it has been considered necessary to add high-quality muckbars to the charge, a pure sponge iron has supplanted, and may soon entirely supplant, the more expensive stock. In addition to a saving of about 30 per cent of the cost of the raw materials, this "new" material has shown definite advantages, especially in regard to the workability of the steels produced.

While definite testimony as to the superior workability of sponge iron steels is available, few records of actual results can be obtained. There have been fracture tests after heat treatment, however, and, as a result, a greater "safety range" is claimed for sponge iron steels than for other steels of high quality. Straight-carbon tool steels made with and without sponge iron have been quenched at various temperatures, and fractures have been compared. It was noticed that, while steels generally considered as giving excellent performance showed approximately the same fracture from 1420 deg. Fahr. to possibly 1530 deg. Fahr., the sponge iron steels gave corresponding results between 1420 and 1630 deg. Fahr.

As a Melting Base in Making Wire

In recent years sponge iron has been used as a melting base for better grades of wire steels. With an increasing demand for better physical properties in steel wire of various kinds, such as cable wire, spring wire and special wires, the manufacturers have resorted to various processes in order to increase the strength of the wire and improve its torsional and bending properties.

For some purposes alloys have been introduced in the steel to meet difficult specifications, and usually at great expense. Lately, specially made carbon wires have been known to give as good service at a considerably lower cost. Sponge-iron wires are known to respond very well to heat treatment, but at the same time the treatment may vary somewhat from standard practice. Therefore, in order to obtain a desired result, this point should be especially studied.

Cases are known, where cold-drawn, high-tensile wire, made in this country from sponge-iron steel, has shown unusual physical properties. The wire produced carried, in spite of higher raw material cost, a low comparative price, even in large dimensions, evidently on account of cheaper working.

Another example of the improvement of cable or rope wire may be taken from the experience of a manufacturer of wire of established quality. The production was based on carefully selected scrap and a high-grade pig iron. By substituting sponge iron for a certain portion of the charge it was possible to improve

the quality from 6 to 20 per cent in torsional properties and from 20 to 35 per cent in bending properties. Certain torsional and bending specifications could formerly be met with a maximum tensile strength of 200,000 lb. per sq. in., but can now be met with a tensile strength of 255,000 lb. per sq. in., using the same equipment and general process of manufacture. Because of increased ductility of the steel, it is claimed that greater reductions per draft are permissible, and it is interesting to note that no higher cost for the final product is reported.

Manufacturers of fine, cold-rolled steels, such as tempered and untempered spring steel, razor blade steels, etc., have had similar experience with sponge iron.

Better Electric Steels from Sponge Iron

Electric steels in the United States have today reached a high stage of development, using comparatively low grades of raw materials, which are highly refined under a double or single slag, but requiring a considerable amount of power for the refining. There have been cases where the addition of a high-grade sponge iron has decreased the refining necessary with a better product the result. While this especially refers to straight-carbon tool steels, alloy tool steels also are being produced with an addition of sponge iron to the charge. Steels extremely low in carbon have been produced in this country directly from sponge iron in the electric furnace under a basic slag, the product showing little or no red-shortness.

The growing difficulty for the maker of straight-carbon, high-grade tool steels in obtaining melting materials entirely free from alloys, especially nickel, makes the application of sponge iron as a melting base for high-grade electric tool steels an interesting possibility. Recent statements are that the average nickel content of plain-carbon selected scrap today is 0.15 per cent and is increasing, because of the wider application of nickel in various commercial steels.

Some electric tool steel makers, who are very particular as to the quality of their product, are today using other high-grade raw materials such as muck-bars, washed metal and pig iron, in addition to scrap from previous meltings of the same steel. For those manufacturers the application of a high-grade sponge iron, low in detrimental impurities and with a high grade of reduction, is of interest. This is especially true if the manufacturers intend to melt with a single carbide slag.

High-quality sponge iron has been repeatedly mentioned in the foregoing discussion. The term "sponge iron," as generally understood, applies, of course, to all iron reduced from the ore at temperatures below the melting point of iron. The grade of reduction—or the extent to which the iron content in the sponge iron is present as metallic iron or as oxides—and also the amount of detrimental impurities are important points to take into consideration. It is important also to know whether or not the impurities are combined with the iron.

By whatever method the production of sponge iron has been attempted, the principle of reduction is radically different from that of the blast furnace. Sponge iron is produced in a constantly reducing atmosphere, where no violent reactions take place. The factors influencing the process are balanced so as not to introduce any excess of carbon or other materials that have to be removed by refining in subsequent working. Properly made sponge iron gives the steel maker a virgin iron base, never molten and never subjected to reactions which, if not detrimental, are at least not very advantageous.

Some Facts About the Swedish Product and Process

The first plant of the Hoeganaes company at Helsingborg, Sweden, had a capacity of only 4000 gross tons of sponge iron a year, while its present capacity is about 15,000 tons. The Hoeganaes process was designed by E. Sieurin, chief engineer in charge of the various operations of the company's plants. In the original process Sieurin used a tunnel kiln. "Crucibles," with layers of coal and ore, as well as other materials, were placed on cars, which were moved through the tunnel in an opposite direction to that of a gas current used for firing the kiln. The cars passed through three distinctly different zones, a preheating zone, a combustion zone and a cooling zone. The product at the start consisted of comparatively small disks of a well-reduced iron, low in impurities. It gained a market at once as a high-grade melting stock, although its price at that time was very high, on account of the high cost of the handling and of the ore used in the process. Subsequently the method was changed considerably, utilizing labor-saving devices and other methods of charging, but the principle of reduction, by carbon monoxide and coal, is the same.

Magnetites, as well as hematites, are used as raw material. An interesting feature of the process is the comparatively low grade of coal used, both for firing the kiln and for charging with the ore. The Hoeganaes company owns large deposits of such coal, high in sulphur and ash, in the southern part of Sweden, and their desire to utilize these deposits was a vital factor in starting sponge iron production.

In the Sieurin process the ore usually is concentrated before the reduction, but separation from the gangue after the reduction is also successfully accomplished. The method of treatment depends on the ore used and use to which the sponge iron is to be put.

Appearance and Composition of the Iron

The product is graded into several classes according to the impurities, chiefly sulphur. In this article it may be sufficient to discuss the grade ordinarily used for steel-making purposes. It is now delivered in round pigs, 10 to 11 in. in diameter and about 2 to 2½ in. thick. Because of the process of manufacture, it is very light and porous, with a specific gravity of 2. When so desired, it is compressed to nearly solid pieces. The pigs are charged directly into the steel furnaces. The iron content has increased as the method has developed; formerly averaging about 94 per cent, it today averages 97 per cent. The grade of reduction is very high, the material containing less than 4 per cent of FeO.

The quantity of detrimental impurities is low, and, owing to the method of production, they are still in the gangue form. The phosphorus usually runs around 0.010 per cent, with 0.013 per cent the maximum; the sulphur content, as CaS, is in this grade 0.025 per cent maximum. No metallic silicon is found, and manganese runs uniformly around 0.025 per cent. As delivered today, the sponge iron contains vanadium to the extent of 0.13 to 0.15 per cent, probably as V_2O_5.

As a residue from the process, carbon is present to 0.03 per cent maximum, while the sponge iron itself is free from carbon, whether as graphite or as combined carbon. The balance is gangue, mainly SiO_2. While one pig may vary somewhat from another, the general analysis given is unusually uniform.

April production of track work for T-rail track of 60 lb. a yard and heavier was 13,511 net tons, according to a report by the American Iron and Steel Institute. This represented a reduction of more than 10 per cent from the March figure of 15,058 tons, but is otherwise the largest monthly total since last June. For the first four months of the year the production has been 49,272 tons, against 62,944 tons last year.

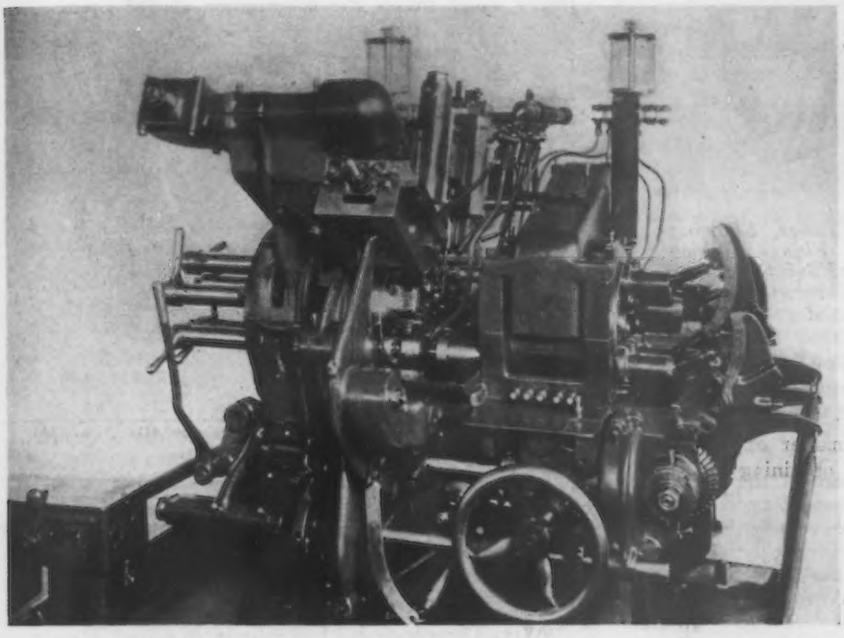
Adapts Automatic Screw Machine for Other Classes of Work

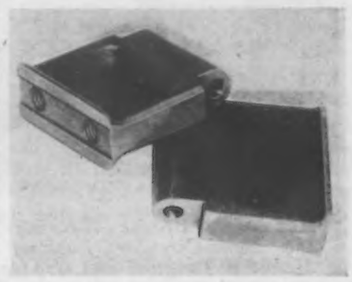
The Davenport Machine Tool Co., Rochester, N. Y., has brought out a "modified" automatic screw machine for work not ordinarily regarded as of screw machine class. The modified machine is adapted for a wide variety of work and increase in production as compared with usual methods is claimed. One application, illustrated herewith, has been the drilling of holes in the male part of an automobile hinge.

The tool mechanism is reversed from that of the regular screw machine, the tools being arranged to revolve while the work is held stationary. The hinge is placed in a fixture in the position usually occupied by the work spindle, and is clamped by one of the five handles shown at the left of the machine. The pin hole is drilled by tools located at the right-hand end of the machine, the first drill being guided by a bushing close to the work and drilling about one-third of the depth. In the succeeding operations the tools in the other positions drill the remainder of the pin hole and in the last position the hole is reamed.

During the pin hole drilling operations the drill spindles, mounted on cross slides, drill the holes for fastening the hinge to the car body. One set of tools drills part of the depth, a second set completes the drilling, and a third set taps the holes. These holes, for fastening the hinge to the car body, are only 1 in. apart, but the drill spindles are arranged so that the driving gears are of fair size and each spindle has independent lengthwise adjustment for the drill.

The method of drilling all the holes at one time is claimed to eliminate errors which might occur by doing the work in several successive fixtures and machines. The longest hole drilled is 1⅝ in. The hinges are drilled and tapped at the rate of 260 to 400 or more per hour, depending upon the carbon content of the material and the speed of the operator. It is also pointed out that this modification of the screw machine permits utilization of one of the advantages of the multiple-spindle automatic, that of dividing long operations into two or more short ones, thereby materially reducing the total time of the machining operations. In common with other of the company's screw machines independent feed is provided for each tool, which permits selection of the proper feeds for the work of each tool.





Automatic Screw Machine Adapted for Drilling Holes in the Male Part of the Automobile Hinge Shown Above. The tool mechanism is reversed, the tools being arranged to revolve and the work held stationary

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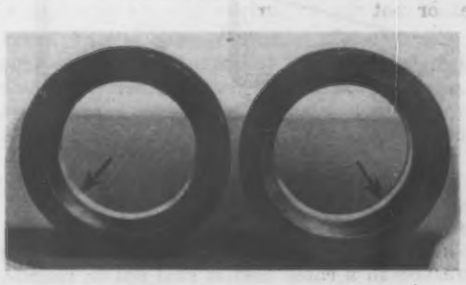
Stellited Carbon Steel Dies Replace Chromium Steel

An improvement in the performance of certain hot-forming dies is noted in the May issue of *Oxy-Acetylene Tips*. It has particular reference to the manufacture of seamless tubing or cylinders by the cupping process. A heat-treated 3 per cent chromium steel ring had been used on the finishing bench (which in this particular instance had a horizontal ram operating through three closely set dies). These dies produced from 30 to 40 pieces each. They were then reground to a larger internal diameter and used in an earlier stage of the process. One difficulty with this type of die was that when deeply ground it became out of round during operation and was difficult to remove from the holder without breakage.

Much better life is now secured from carbon steel rings, having the working surface built up by stellite, welded on by the oxy-acetylene blowpipe. After grinding to correct size, the die is ready for work.

When the die is worn too large or the base metal is reached, the surface is ground, re-stellited and trued up. It is then ready again for use in the same stage. This operation is repeated over and over again. The stellite surface only is exposed to abrasive wear, and, when this is renewed, about the same service is obtained as from the original coating.

Such dies in the first and second stages of the finishing bench will yield as high as 2000 pieces before it is necessary to rebuild them. The last die must be held much closer to dimension, and makes from 200 to 800 pieces before it needs to be replaced.

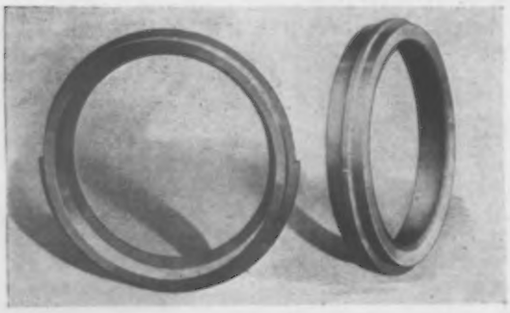


Stellited Rings Used for Dies in Cupping Draw. Left, newly made; right, after 822 draws

Double-Suction Centrifugal Pumps

A new line of general service centrifugal pumps has been placed on the market by the Economy Pumping Machinery Co., 3431 West Forty-eighth Place, Chicago.

These pumps, a re-design of the original Economy double suction line, contain many refinements, both mechanical and hydraulic. The makers claim efficien-



Renewable Bronze Wearing Rings, Showing the Semi-Circular Locking Flange Which Makes a Tongued and Grooved Joint with the Case and Butts Against the Cover, to Prevent Turning

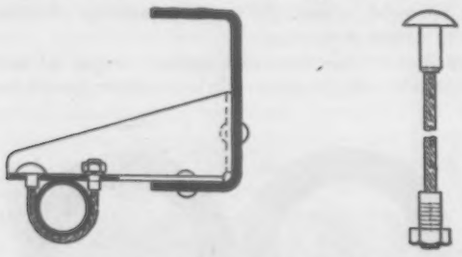
cies over 80 per cent from pumps of 800 gal. a minute and still higher efficiencies in larger sizes. The new line is designed for standard motor speeds of 1750 r.p.m. at 100 ft. head and 1750 or 3600 r.p.m. for heads up to 200 ft.

All these single-stage pumps are of the horizontal split-case design, equipped with sealed type ring oiling bearings. Bearing brackets are cast with the case. Renewable bronze wearing rings are designed with a semi-circular male flange which locks them in the case. They are of the ell shape, which takes advantage of the centrifugal action of the water to prevent leakage. Shafts are of alloy steel turned and ground all over. They are protected, where exposed to the liquid, by cast bronze shaft sleeves held in place with nuts.

Flexible Bolt Made from Wire Rope

Designed for places where rigid U-bolts are impracticable, the flexible bolt illustrated has been developed by the American Cable Co., Chicago. It may serve as an auxiliary hanger for power shafts, suspension bracket for overhead steam or water piping, shackle bolt for temporary wall boxes, tanks, etc., for scaffolding and tackle, on various parts of machinery, and in other places where semi-flexible connections are necessary.

This new flexible bolt rests on the preformed type of wire rope. Preforming the wires and strands to the



Showing Make-Up of the Flexible Bolt and One of Several Uses

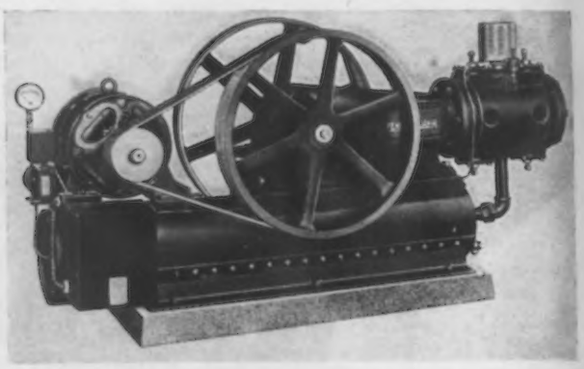
exact helical shape they must assume in the completed rope results in a cable that is said not to require seizing, but may be cut like a rod. A close fitting attachment is slipped over the unseized end of the rope. It may then be processed so that the steel of the fitting cold-flows into the interstices of the rope, and thus becomes practically an integral part thereof. Such fittings can be threaded for a nut or capped for a head. The flexible bolt which has resulted from these developments is available in varying lengths.

Self-Contained Single-Stage Compressor

For use in small industrial plants and garages where compressed air requirements are comparatively limited, the Pennsylvania Pump & Compressor Co., Easton, Pa., is offering the single-stage double-acting multiple-belt-driven air compressor here illustrated.

The machine is self-contained and semi-portable. The motor, starter, multiple-belt drive, air receiver, air filter, and automatic start-and-stop control are assembled in place, forming a compact unit which occupies floor space of 6 ft. 6 in. by 2 ft. 4 in. A hopper cooling tank can be furnished.

Valves are of the company's air cushioned type. The machine is equipped with a 10-hp. high torque motor which drives the compressor at 400 r.p.m. The



The Capacity Is 65 Cu. Ft. of Free Air Per Min., Piston Displacement

piston displacement is 65 cu. ft. of free air per min. and the automatic control is for pressures of 85 and 125 lb. The weight of the machine is 1380 lb.

Lift-Truck for Handling Heavy Reels

A new storage battery lift truck designed especially for handling reels of wire, cable, etc., has been de-

Illustrating How the Reel Is Hauled Up the Apron to the Platform

veloped by the Lakewood Engineering Co., Cleveland. The truck has a capacity of 6000 lb. and will handle reels up to 60 in. in diameter and 42 in. wide.

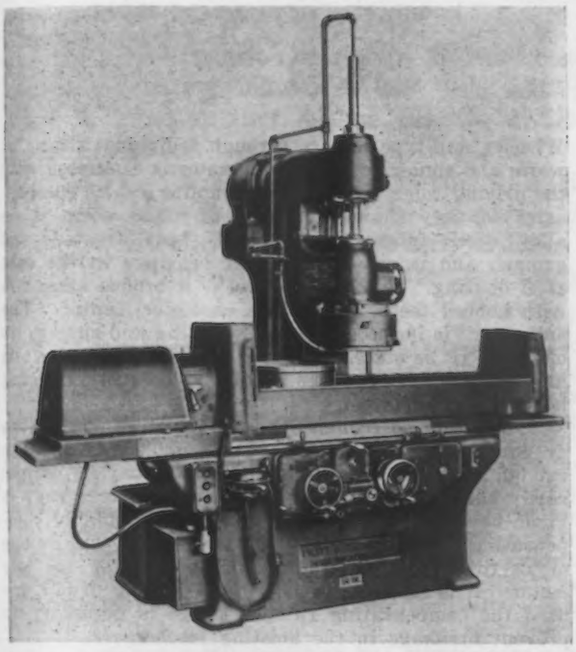
The winches slide upward on the trunnions and wind in at the same time, thus securing a double action. Previously a rather difficult handling problem, the transportation of these heavy reels is now made safe and easy. The sloping apron on the carrying table is shown in the illustration.

Engineering Foundation has issued its annual report for its thirteenth year, which ended Feb. 16. Brief details are given of a considerable number of researches under way, illustrations being shown of some of the apparatus used in the work.

New Rotary Chuck for Pratt & Whitney Vertical Surface Grinder

A separately-driven self-contained rotary chuck has been developed by the Pratt & Whitney Co., Hartford, for use with its 14-in. vertical surface grinder, model B.

The chuck is 16 in. in diameter and may be either of plain or magnetic type. It is arranged for bolting to the left-hand end of the regular table of the machine and is driven by a separate 2-hp. 1200-r.p.m. motor, which is also mounted on the left-hand end of the table. This motor drives the chuck through a two-speed gear box, spiral bevel gears and a worm and worm wheel being used to transmit the power from the gear box to



The New Rotary Chuck Is Bolted to the Table of the Machine and Driven by a Separate Motor Through a Two-Speed Gear Box. A device for automatically locating the chuck under the wheel is available

the chuck. The gear box provides chuck speeds of 108 and 154 r.p.m., changes being made by means of a lever on the front of the housing. Operation is further facilitated by a push-button control which includes a jog button. The regular machine controls are used to move the table in and out under the grinding wheel.

The plain rotary chuck has its surface finished smooth for the use of fixtures, which may be held in place with screws tapped into the surface. The new magnetic rotary chuck has greater holding power than previous models. Current is carried to the coils through a new type of collector ring, and the chuck is designed so that water and lubricating oil cannot reach and damage the coils. There is a set screw at the side of either type of chuck to permit tilting it, and in thus providing for a wide range of concave and convex surfacing the usefulness of this type of machine is widened. Lubrication is supplied to all moving parts, except in the motor, from three reservoirs, and all parts are entirely inclosed to protect the gears and bearings from grit and coolant.

Electrical braking is provided for the motor so that the chuck may be stopped quickly when the power is turned off. Solenoid type braking is employed for alternating current motors and dynamic braking for direct current motors.

The new rotary chuck is arranged for tilting 1½ deg. above, or 5 deg. below, horizontal. The distance from the chuck surface to a new wheel is 7¼ in. for the plain chuck, and 4 in. for the magnetic chuck. These distances can be increased with raising blocks if desired. A special device which will automatically locate the rotary chuck under the wheel, in the proper position for grinding, is available for use on the machine. With this device the table of the machine advances to the right under power and is stopped in the correct position without attention from the operator. It is withdrawn from under the wheel to the loading position in the same manner.

Gasoline Driven Excavating Shovel

A new gasoline shovel of the full revolving type, and fully convertible to dragline, back hoe, clamshell and crane service, has been placed on the market by the Osgood Co., Marion, Ohio. The unit is mounted on a new and improved continuous-tread truck frame of the double-chain drive type.

As a shovel, the machine carries a minimum length boom of 20 ft. and a handle of 15 ft., with a back hitch type dipper. For crane service it carries a 45-ft. boom of the structural lattice bow-type, with built-in tagline, and with a fairlead for dragline service, self-adjusting to any angle of the boom.

An 80-hp., six-cylinder gasoline motor is mounted at the rear of the machine on the massive unit steel main body frame casting. Heavy unit steel sideframes securely attached to the main body casting support the drum shaft and the reversing shaft. This assures alinement of parts and reduces vibration to the minimum.

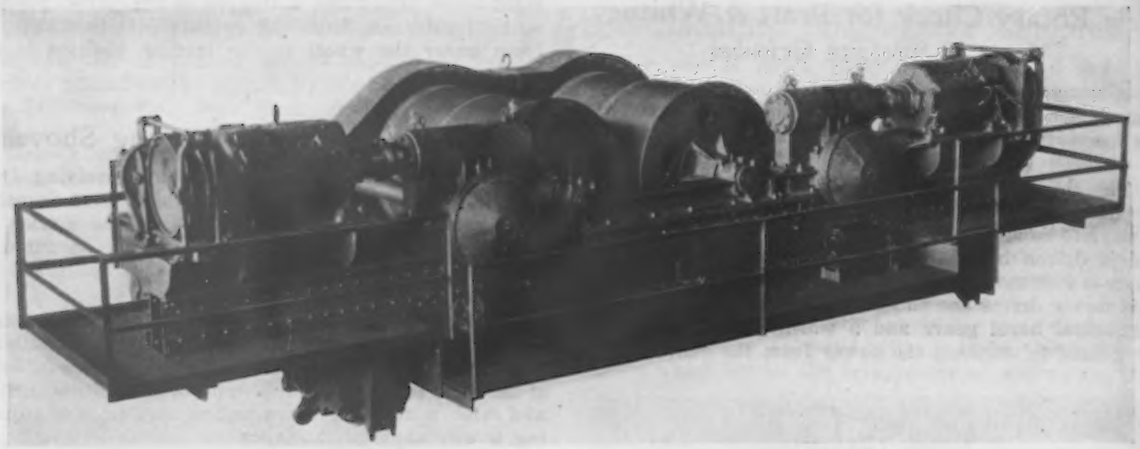
A special feature is the combination of cast iron gasoline tank and counterweight, which is set into the deck at the rear of the motor. This arrangement saves space and extra counterweight and at the same time greatly reduces the fire hazard, because of the heavy walls of the gas tank. The tank has capacity of about 75 gal., which is usually enough for a two-day supply.

The continuous-tread truck, of the double-chain drive type, is built up of steel castings, with axles and

Caterpillar Tread Turned Up on End, to Show the Method of Driving

cross-travel shaft of hammered steel. The truck frame is a single massive steel casting. The roller path gear is of cast steel with cut teeth of the outside type. It is securely riveted into place on the truck frame casting, and has a machined shoulder to hold it securely in place. The side frames are large unit castings of box section, bow type construction. Five travel rollers 14 in. in diameter are mounted within each side frame. These rollers operate on stationary shafts and are lubricated by recessed high-pressure gun fittings.

Shipments of electric industrial trucks and tractors in April are reported by the Department of Commerce at 137 units, compared with 131 in March. Except for last June, with 140, the April total is the largest in more than a year. It included six units for export. Of the domestic total, nine were tractors and 122 of other types.



Main Hoist of Morgan Crane for Otis Steel Co.

Crane with Four Girders and Two Trolley Tracks

Designed with various improvements to assure efficient operation, low upkeep, long life and safety, a 200-ton seven-motor, four-girder crane was built recently for the Otis Steel Co., Cleveland, by the Morgan Engineering Co., Alliance, Ohio. One feature of this crane is that the main hoist is worm driven. Besides the main trolley the crane has a 40-ton auxiliary.

Two outside or main girders support the main trolley while the two inside girders support the auxiliary trolley. The design permits full travel of each trolley on its own set of girders; the small trolley may pass underneath the larger one without interference. The bridge of 59-ft. span is carried on double compensating trucks, eight in number, and connected by structural steel equalizers. A total of 16 heat-treated steel wheels 30 in. in diameter supports the load. The bridge is driven by two 85-hp. Crocker-Wheeler mill-type motors. Full magnetic control is used throughout.

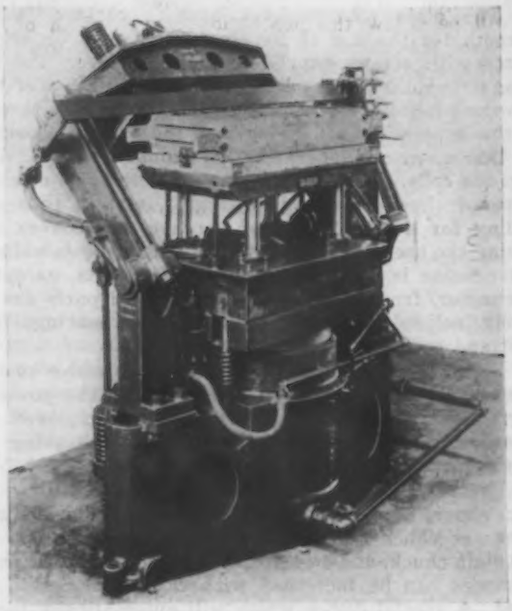
The main trolley of 200-ton capacity is supported on four cast steel compensating trucks bearing on eight heat-treated steel wheels 24-in. diameter. The main trolley frames, as shown in the view, are heavy structural steel beams to which are attached cast steel brackets. The main hoisting mechanism consists of two interlocked drums driven by two 110-hp. Crocker-Wheeler mill-type motors through individual trains of worm and spur gearing. Each motor is connected with the driving worm by a flexible coupling, which compensates for any slight misalinement. The worm is an alloy steel forging, carbonized, heat treated and ground, and is carried in roller bearings in the cast steel housing. The worm wheel is a bronze alloy rim with hobbed teeth, bolted to a cast steel center. The entire unit is inclosed in a steel housing and runs in an oil bath. It is stated that the worm reduction unit is highly efficient and makes a quiet and smooth running hoist.

Under normal conditions each hoisting unit takes an equal share of the load, but should the current be cut off from one motor the entire load may be temporarily handled by the active motor. This emergency is taken care of by means of the Morgan patented compensating ratchet device, which temporarily allows one motor to lift the entire load without turning the idle motor. It is stated that where interlocking drums are used the compensating ratchet device is necessary to prevent breakage in the hoisting mechanism.

An 85-hp. motor drives the 40-ton auxiliary hoist. This trolley is carried on four 18-in. track wheels. The trolley frame, motor supports and sheave supports of cast steel are cast integral, thus eliminating loose and bolted parts. Sheaves are equipped with Hyatt roller bearings, and the bridge trucks are so arranged that these bearings may be added if desired.

Jarring, Stripping, Squeezing Machine for Automobile Manufacture

Use of the trunnion type yoke in place of the pintle swung yoke is one of the features of a 30-in. jarring, stripping, squeezing, molding machine made by the Tabor Mfg. Co., Philadelphia, for a manufacturer of high-grade automobiles. The machine is of the Tabor flask life type, embodying the company's shockless jarring machine principle. The mold is vented by an air-operated head mounted in the yoke and the automatic strike-off is another special feature.



One Feature of This Machine Lies in the Employment of the Trunnion-Type Yoke. Automatic strike-off is provided

Circuit Breaker for Heavy Current

An oil circuit breaker adapted for service where a relatively compact unit for heavy alternating current, 2500 volts or less, is required has been developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The breaker is self-contained, the pole units, operating mechanism and control panel all being carried on a rigid steel frame arranged to mount on and bolt to the floor. The tanks can be lowered to the floor and removed from either side of the breaker. Current-carrying studs are arranged for direct bolted connection to the buses. The standard arrangement for operating the breaker is by an electric solenoid mechanism.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Statistical Data Concerning the Chief Consuming Industries Indicate That:

Expansion of activity in chief consuming industries has been halted and further decline may be anticipated.

Car and locomotive buying in April showed a good gain, but surplus cars give little promise of early orders.

Automobile production is clearly expanding and has been a recent leader in upholding steel demand.

Building volume continues large, but expansion may not be sustained; structural sales are declining.

Iron and steel exports have held up well, but are not expected to expand.

IT looks very much as though steel production is developing in excess of requirements. Of course, one might draw this conclusion from the mere fact that prices in general are weak. Ordinarily, if production is well in line with requirements, there would be no such prevalence of price concessions and failure to hold announced prices as now exist. However, our statement is based on the statistical fact that in April the average daily rate of steel ingot output rose well above its usual relation to the activity in the chief steel consuming industries. Production in March was moderate in comparison with the composite demand line. In fact, this is true of the whole first quarter. But apparently this condition has stimulated activity in production unduly, causing the ingot output curve to rise with unusual sharpness, considering the season. *The upturn in our adjusted index in April has not been equaled since the same month in* 1923.

Index of Composite Demand is Lower

IN March, however, our index of the average activity in the steel consuming industries declined, and present indications are that a further decline will appear in the April figures. Even if there is no decline, the curve of indicated consumption requirements will be below the production curve, which of course means a tendency to over-production. As long as production is above the level indicated by the composite demand line, steel markets will be in an unstable equilibrium, prices will be weak, and ultimately curtailment will inevitably occur.

Production may show only the usual seasonal decline for several months, as was the case at this time in 1923, when the seasonally adjusted curve held steady through July; but the longer curtailment is postponed, the more drastic will probably be the final readjustment. The normal seasonal movement in steel production calls for a 12 per cent reduction in the average daily ingot output between April and July. That is, unless a reduction of that amount occurs, production will become more excessive—assuming that the composite demand line does not rise in the meanwhile.

The decline in the composite demand line in March was due (1) to the failure of railroad freight traffic to show a normal seasonal gain; (2) to a sharp reduction in the rate of building contracts (floor space); (3) to a slight recession in general manufacturing. That the decline was no sharper was due to a slightly more than seasonal gain in automobile production and exports, and a well maintained volume of mining and agricultural requirements. The fact that machine tool orders increased in March may be mentioned, also.

Conditions in Definite Lines

As to the future of the requirements of steel, the following observations seem pertinent:

1.—The demand from *railroads* does not seem likely to show much if any increase. April freight tonnage

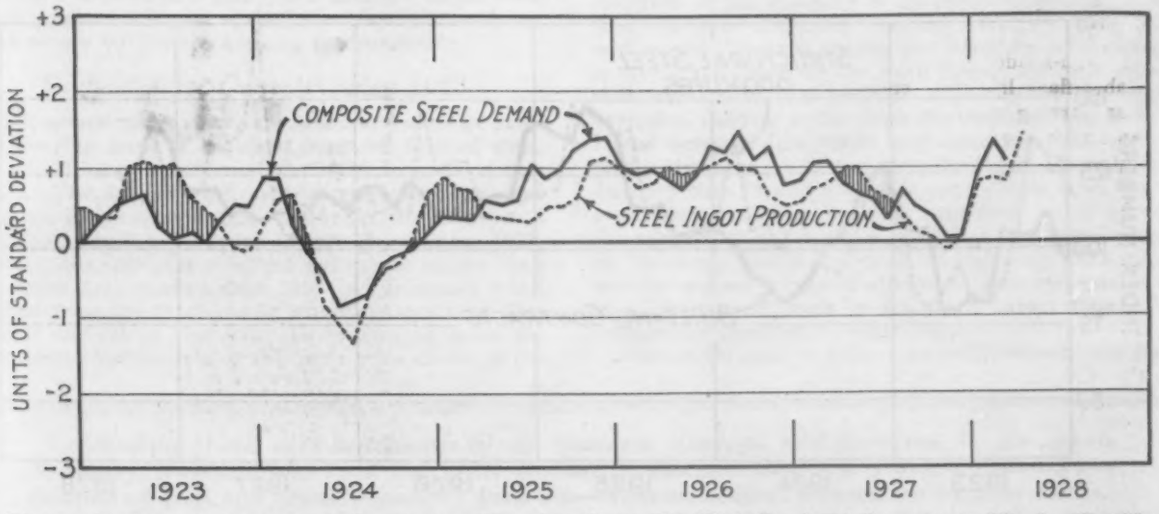


Fig. 1—Steel Production Has Advanced Still Further Above the High Levels of January to March. But the curve of composite demand declined in March and the outlook for the immediate future is less encouraging

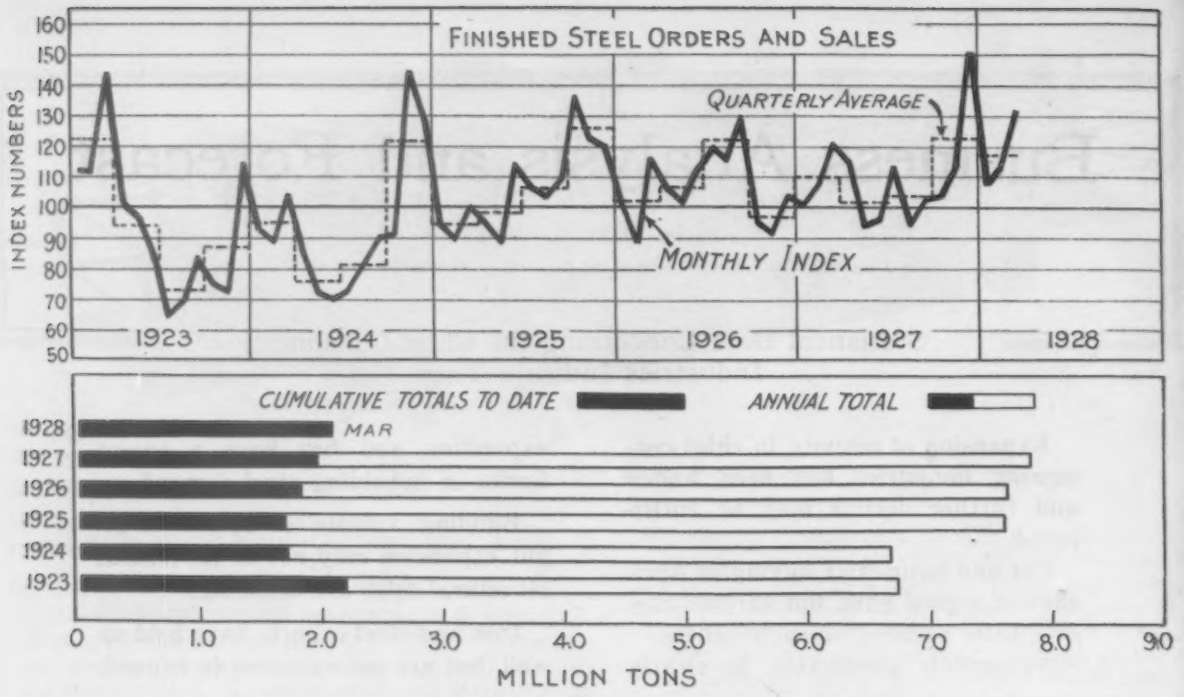


Fig. 2—Buying of Finished Steel Showed a Good Seasonal Increase in March, and the First Quarter Was the Highest First Quarter Since 1922

declined sharply, when allowance is made for seasonal conditions, and our index is only 99.4 per cent of the average for the last seven years, in comparison with 106.3 per cent in March. The trend of railroad gross revenues has been downward and only through drastic economies has net income been maintained fairly well by the carriers. The condition of the coal business and the prospects for a let-up in building activity make the outlook hardly fair, either as to the carriers' needs or as to their ability to pay.

2.—*General manufacturing* activity (excluding the steel and automobile industries) declined a little in March, which is an unfavorable sympton. Our adjusted index has not declined previously in that month since 1924. The prevalence of severe competition and narrow margins of profit is to be noted. There was a sharp decline in retail trade in April, which indicates the effect of unemployment and bad weather. The P-V line has fallen a little lower. It seems doubtful if manufacturing activity will be maintained at present levels much longer.

3.—In view of the upward trend in money rates, speculative *building activity* will probably soon be checked. Already the volume of real estate transfers has declined. But construction contracts made a little recovery in April, increasing more than usual for the season, so that any decline in building is not likely to be sharp. Building permits, however, slumped rather badly in April and, as the trend of such permits generally leads the contracts awarded, it seems probable that some decrease in the actual volume will be seen within a month or two. It will be noted that the awards of structural steel have tapered off during the past four or five weeks. The decrease in residential building may be partly responsible for the situation in the market for nails. Building has been one of the mainstays of the demand for steel this winter and spring, so that any recession here will probably necessitate curtailment in production.

4.—The *automobile industry* has been the largest factor in the increase of steel consumption. Here we find the seasonal peak reached, and early estimates for April indicate that some decline occurred, in spite of the fact that normally an increase was to have been expected. Ford production is gradually expanding and at the same time we see signs of even keener competition. It seems probable that the steel industry has already enjoyed the maximum stimulus from the 1928 automobile program, and that some decrease in orders from that quarter is near at hand.

5.—*Mining* (including the oil industry) continues about steady at a low level, with no prospects of early improvement. The coal industry is depressed and, although the average daily output of bituminous coal turned downward sharply in April, the price situation has not become any more favorable. Oil refining has

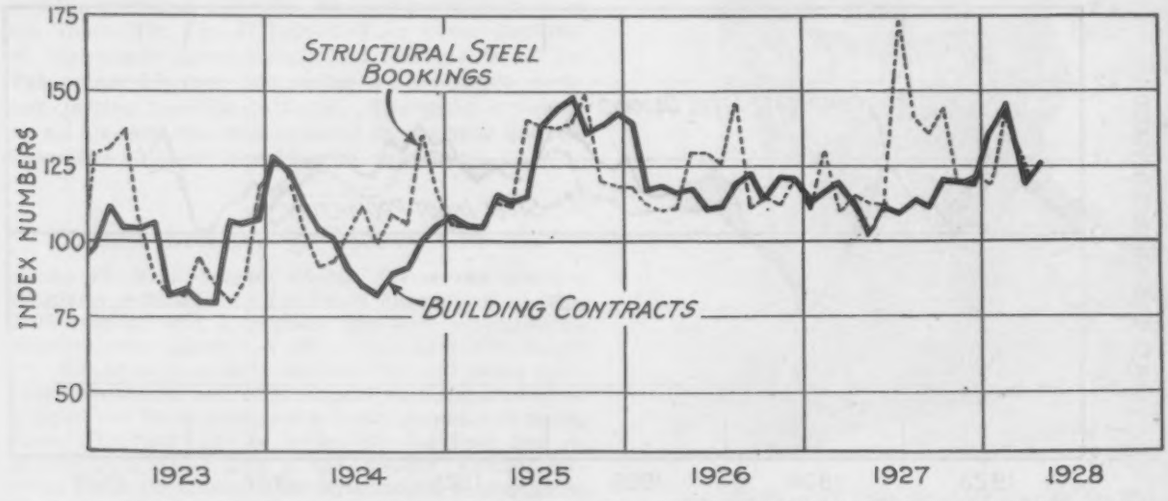


Fig. 3—Building Contracts Have Remained High But Show Signs of Slackening. Structural steel bookings declined in March by more than the usual amount

become a little more profitable during the last month or two, due chiefly to higher gasoline prices. But crude oil production and imports continue excessive, in spite of the low domestic drilling activity. The copper industry is fairly prosperous and prices are firmer, but probably copper markets are maintained largely as a result of a very moderate rate of production, which naturally does not indicate any large consumption of steel.

6.—The demand for *agricultural machinery* has been good for some months and has supplied the steel business with an appreciable volume of orders. Just now a little seasonal let-up is to be expected. As to the situation in the second half of the year, we receive reports that dealers' stocks are small, which would suggest the possibility of renewed activity in the agricultural implement industries. Some food for thought, however, may be seen in the fact that the outlook for some of the staple grain crops and cotton does not seem to be good. The higher the prices for wheat, the smaller the acreage to be harvested is likely to be.

As to steel *exports*, it must be admitted that they have held up very well, in spite of the increase in foreign production. Apparently no early let-up is to be anticipated. Nevertheless, developments in foreign exchange and in the capacity of European steel producers do not lend much support to any hope of further gains.

composite demand line. It reflects the large increase in automobile production and the high level of building activity.

The outstanding factor in the March gain in orders is found in the large volume of sheet sales. The increase in sales of sheets was not much more than usual for the season, but it carried the March figure to a new record, the 399,400 odd tons of sheets sold in that month comparing with 325,500 tons in March, 1923.

Structural steel bookings were large also, in comparison with February, but decreased more than usual for the season. Nor was the March volume so extraordinarily large in comparison with the same month in recent years as was the case with sheets. Moreover, current reports indicate a decline in structural business during April, in which month there is usually a gain. The average weekly structural awards amounted to only 31,000 tons, against an average of 37,000 tons in March. Fabricated plates made a relatively poor showing, the sales declining in March, as they did last year. The volume was below that of a year ago and far under the level reached in March, 1923. Bookings of steel castings decreased in March also, and were the lowest for the month since March, 1922.

Thus sheet tonnage has been the chief factor in the high first quarter level of orders for finished steel.

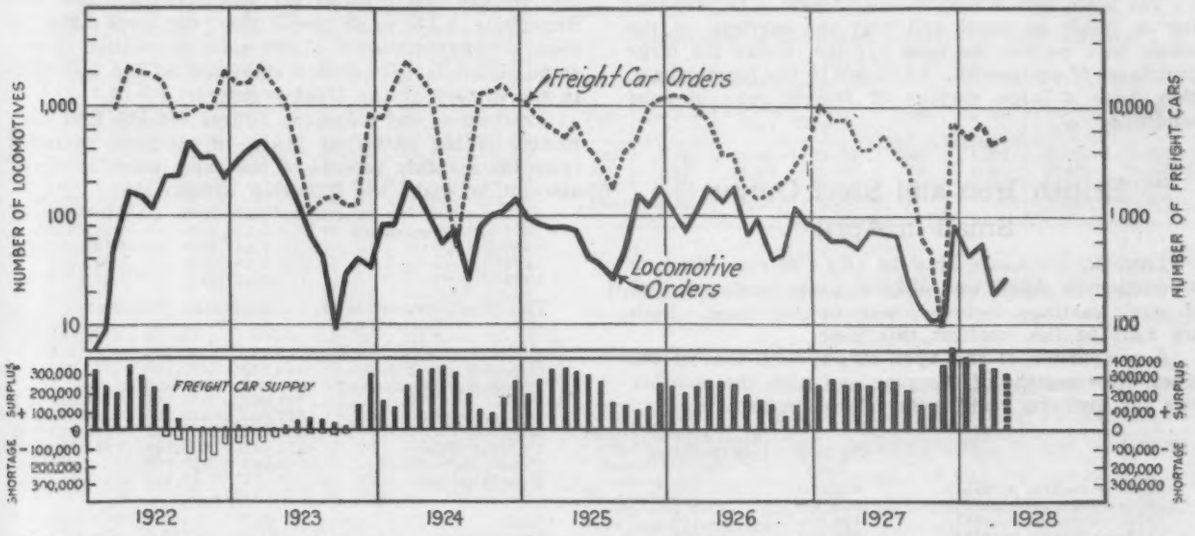


Fig. 4—Locomotive and Railroad Car Orders Were Higher in March. But the large surplus of cars does not indicate immediate need for heavy purchases

On the whole, the prospects seem to indicate a gradual decline in the activity of the chief steel consuming industries. Also the narrowness of the margins of profit in most industries does not indicate a strong purchasing power. Nor does it seem likely that any considerable shortages of material or equipment exist. We conclude, therefore, that the composite demand line will show a downward trend, and that the longer steel ingot production moves against the seasonal trend, the more severe will be the ensuing readjustment.

Highest First Quarter Since 1923

OUR second chart shows the trend of orders or sales covering some of the chief items of finished steel. No adjustment for seasonal variation is made in this chart. The finished steel orders curve showed a good seasonal increase in March. The index for that month was the highest to be found in any March since 1923. In fact, the total for the first quarter is larger than any other first quarter since 1923—an unusually small decline from the total in the preceding quarter. This fact is not out of line with the indications as to the industrial requirements of the country, as shown in the *This confirms the opinion that the automobile industry, not building activity, has been the leader in the recent expansion.*

Building Less Buoyant Than Reported

ACCORDING to our interpretation, the building data for April do not furnish the basis for so much optimism as has appeared in the press statements. The floor space in contracts awarded certainly made no new record. There is usually and normally an increase in April, and this year the April figures did little more than average in this respect. Allowing for seasonal variation, building is far below the rate that was maintained between July, 1925, and January, 1926, inclusive. Moreover, it is considerably below the rate in January and February of this year. It is true, however, that building contracts continued much above the average of recent years, and that the interruption of the sharp March decline is encouraging. We may look for a good volume of structural steel business, but it is doubtful if there is reason to expect that any sustained expansion is beginning.

Structural steel bookings declined in March, and the

Schedule of the next instalments of the **Business Analysis and Forecast**, *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* **May 24**—*Position of Iron and Steel Producers;* **June 14**—*Activity in Steel Consuming Industries.*

decline was greater than usual for the month. This trend followed closely that of building contracts (see Fig. 3). Normally the bookings gain about 7 per cent in April. This year, however, the weekly trade figures indicate a decline in structural steel awards last month. If this indication is correct, we may infer that the increase in building contracts involved a smaller quantity of steel than usual.

Some Recovery in Railroad Orders

RAILROAD equipment orders last month made a fair showing as to trend. Orders for both cars and locomotives were larger than in the preceding month and in the same month last year. According to *Railway Age*, 33 steam locomotives were ordered by domestic companies. Except for last year, this is the lowest volume of April business in a good many years. Moreover, while the total unfilled orders of the locomotive manufacturers increased a little in April, shipments declined to a greater extent, thus indicating that total orders fell off.

Freight car orders in April amounted to 5318, which compares with 4470 in March and 3362 a year ago. These figures, however, are very small when contrasted with the business done in earlier years. Thus, in 1922 April orders amounted to 34,192; in 1923 to 10,420; in 1924 to 11,903.

The plain fact is that railroad traffic is not expanding so much as usual and that the carriers on the whole have neither the need nor the income for large purchases of equipment. As shown in the fourth chart, they have a large surplus of freight cars in good condition.

British Iron and Steel Output Small in April

LONDON, ENGLAND, May 14 (*By Cable*).—Pig iron production in April was 555,000 gross tons and that of steel, castings included, was 644,100 tons. Both are next to the smallest this year.

A comparison of the April output with that of the other three months of the year and with the monthly rate for previous years is as follows in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Average monthly	855,000	638,600
1920—Average monthly	669,500	755,600
1922—Average monthly	408,500	490,100
1923—Average monthly	620,000	706,800
1924—Average monthly	609,900	685,100
1925—Average monthly	519,700	616,400
1926—Average monthly	203,500	296,700
1927—Average monthly	607,800	758,200
1928—January	560,600	626,200
1928—February	550,800	764,400
1928—March	592,600	793,300
1928—April	555,000	644,100

April Construction Contracts Broke All Records

Building contracts in the 37 States east of the Rocky Mountains made a new high record in April, according to F. W. Dodge Corporation. The total was $643,137,000, exceeding the previous high mark, in June, 1927, of $632,478,000, by nearly 2 per cent. Only five other months—August, 1925, March and August, 1926, and March and April, 1927—have reached $600,000,000.

For the first four months a new record was made, at $2,128,204,000, a gain of 6 per cent over last year.

April made the highest total ever reached in the Middle Atlantic States and the highest April in both New England and the Central West. It was the second highest April in the Southeastern States. There was a falling off, however, in the Pittsburgh district, in the Northwest and in Texas.

Average weekly earnings in representative factories in March are reported by the New York State Industrial Commissioner at $29.64. Except for the $29.78 of March last year, this is the highest monthly figure ever reported. It represents a gain of 48c. over February, this being about 1.7 per cent.

SHEET SHIPMENTS HEAVY

Slump in Sales Cuts Backlog—Record Four Months' Output

THE interesting feature of the monthly report of the sheet division, National Association of Flat Rolled Steel Manufacturers, 511 Terminal Tower Building, Cleveland, is that the shipments and the production of steel sheets in April were practically the same. The difference was only 235 tons. Shipments exceeded sales for the month by 43,604 tons. Unfilled orders at the end of April amounted to 571,761 tons, a decrease of 103,435 tons, compared with the total at the end of March. The unfilled orders as of March 31, plus the sales of April and minus the shipments, would have produced unfilled orders of 631,592 tons at the end of last month, but the official report gives a total of 59,831 tons lower.

For the first four months of the year production was 1,341,142 tons, which is a record for that period. This record gains further importance from the fact that the most active period in sheets, the report discloses, is in the first quarter of the year and the figures and comparisons include that period. The nearest approach to this year's showing was in 1926, when the production for the first third of the year was 1,297,139 tons. Shipments in the same period this year were 1,259,752 tons, or approximately 27,000 tons more than in the same period in 1926, which stood out as the best year in the history of the sheet industry.

Production and shipment figures for the first four months of the past four years, in net tons, compiled from the monthly reports of the sheet manufacturers' association, make the following comparison:

	Production	Shipments
1928 (four months)	1,341,142	1,259,752
1927	1,241,467	1,139,725
1926	1,297,139	1,232,893
1925	1,171,104	1,071,336

The April report with comparisons follows:

	April	March	February
Total number of mills	721	721	718
Capacity per month	464,422	492,150	461,750
Percentage reporting	72.2	72.3	72.6
Sales	284,070	399,441	266,210
Production	327,909	366,127	330,565
Shipments	327,674	359,532	298,420
Unfilled orders	571,761	675,196	667,054
Unshipped orders	109,200	110,702	.....
Unsold stocks	53,853	53,144	.....
Percentages to Capacity			
Sales	84.7	112.4	79.5
Production	97.8	103.0	98.7
Shipments	97.7	101.1	89.1
Unfilled orders	170.4	189.9	199.2
Unshipped orders	32.6	31.1	....
Unsold stocks	16.0	15.0	....

Large Shipments of Galvanized and Enameled Sheet-Metal Ware

WASHINGTON, May 15.—Shipments of enameled sheet-metal ware in March, as reported to the Department of Commerce from 18 manufacturers, comprising approximately 80 per cent of the industry, were 442,689 dozens, valued at $1,665,470, as compared with 372,848 dozens, valued at $1,459,188, in February. The March total, comparing with 440,689 dozens and $1,484,980 in March, 1927, was the largest in considerably more than a year.

March shipments of galvanized sheet-metal ware, as reported to the Department of Commerce by 15 concerns comprising a large proportion of the industry, were 220,677 dozens, valued at $824,143, as compared with 188,487 dozens, valued at $727,257, in February. In March, 1927, the totals were 213,672 dozens, valued at $790,371. Except for April, 1927, the most recent totals were the largest in more than a year.

Index numbers of wholesale prices on the pre-war base, and covering the period from 1890 to 1927, inclusive, have been published by the United States Bureau of Labor Statistics, Washington. The pamphlet is of 52 pages and gives the month-by-month figures for groups of commodities. For 1927 the monthly details are given for the hundreds of individual commodities used in making up the groups.

Fifth Largest Year in Production of Rolled Steel

PRODUCTION of all kinds of finished rolled iron and steel in 1927 is reported by the American Iron and Steel Institute at 32,879,031 gross tons. This is a reduction of 7.37 per cent from the record total of 35,495,892 tons in 1926. It has been exceeded by only three other previous years—1917, 1923 and 1925—each of which made between 33,000,000 and 33,400,000 tons. Of the 1927 total, steel accounted for 32,334,687 tons and iron for 544,344 tons, the latter being only 1.66 per cent of the aggregate. Comparison may here be made with 1921, when the iron tonnage was almost precisely the same as in 1927, whereas the steel tonnage was considerably less than half that of last year. The proportion of iron is dwindling rapidly.

Structural shapes made a tonnage in 1927 second only to the great total of 1926. Plates and sheets, taken as an aggregate, made the largest total ever recorded, with the exception of 1925 and 1926. Steel black plates for tinning were second only to 1926. Concrete bars, showing a slight gain over 1926, made the largest total on record with the exception of 1925, which was less than ½ per cent greater. Skelp made the third largest year's total, having been exceeded only by 1923 and 1926. Galvanized sheets and formed

Total Production of All Kinds of Finished Rolled Iron and Steel, 1891-1927

Years	Iron and Steel Rails	Plates and Sheets	Nail Plate	Wire Rods	Structural Shapes	All Other Finished Rolled	Total Gross Tons
1891	1,307,176	678,927	223,312	536,607	.....	2,644,941	5,390,963
1892	1,551,844	751,460	201,242	627,829	453,957	2,579,482	6,165,814
1893	1,136,458	674,345	136,113	537,272	387,307	2,104,190	4,975,685
1894	1,021,772	682,900	108,262	673,402	360,305	1,795,570	4,642,211
1895	1,306,135	991,459	95,085	791,130	517,920	2,487,845	6,189,574
1896	1,122,010	965,776	72,137	623,986	495,571	2,236,361	5,515,841
1897	1,647,892	1,207,286	94,054	970,736	583,790	2,497,970	7,001,728
1898	1,981,241	1,448,301	70,188	1,071,683	702,197	3,239,760	8,513,370
1899	2,272,700	1,903,505	85,015	1,036,398	850,376	4,146,425	10,294,419
1900	2,385,682	1,794,528	70,245	846,291	815,161	3,575,536	9,487,443
1901	2,874,639	2,254,425	68,850	1,365,934	1,013,150	4,772,329	12,349,327
1902	2,947,933	2,665,409	72,936	1,574,293	1,300,326	5,383,219	13,944,116
1903	2,992,477	2,599,665	64,102	1,503,455	1,095,813	4,952,185	13,207,697
1904	2,284,711	2,421,398	61,601	1,099,028	949,146	4,597,497	12,013,381
1905	3,375,929	3,532,230	64,542	1,808,688	1,660,519	6,398,107	16,840,015
1906	3,977,887	4,182,156	54,211	1,871,614	2,118,772	7,383,828	19,588,468
1907	3,633,654	4,248,832	52,027	2,017,583	1,940,352	7,972,374	19,864,822
1908	1,921,015	2,649,693	45,747	1,816,949	1,083,181	4,311,608	11,828,193
1909	3,023,845	4,234,346	63,746	2,335,685	2,275,562	7,711,506	19,644,690
1910	3,636,031	4,955,484	45,294	2,241,830	2,266,890	8,475,750	21,621,279
1911	2,822,790	4,488,049	48,522	2,450,453	1,912,367	7,316,990	19,039,171
1912	3,327,915	5,875,080	45,331	2,653,553	2,846,487	9,908,475	24,656,841
1913	3,502,780	5,751,037	37,503	2,464,807	3,004,972	10,030,144	24,791,243
1914	1,945,095	4,719,246	38,573	2,431,714	2,031,124	7,204,444	18,370,196
1915	2,204,203	6,077,694	31,929	3,095,907	2,437,003	10,546,188	24,392,924
1916	2,854,518	7,453,980	30,088	3,518,746	3,029,964	15,493,093	32,380,389
1917	2,944,161	8,267,616	22,864	3,137,138	3,110,000	15,585,921	33,067,700
1918	2,540,892	8,799,135	18,310	2,562,390	2,849,969	14,385,058	31,155,754
1919	2,203,843	7,372,814	12,832	2,538,476	2,614,036	10,359,543	25,101,544
1920	2,604,116	9,337,680	20,577	3,136,907	3,306,748	13,941,835	32,347,863
1921	2,178,818	4,260,574	14,573	1,564,330	1,272,624	5,483,087	14,774,006
1922	2,171,776	7,968,397	21,969	2,654,741	2,718,768	10,916,353	26,452,004
1923	2,904,516	9,497,717	22,833	3,075,892	3,405,197	14,370,921	33,277,076
1924	2,433,332	8,087,883	22,175	2,522,545	3,283,708	11,736,792	28,086,435
1925	2,785,257	9,807,659	22,938	2,844,656	3,604,130	14,323,220	33,386,960
1926	3,217,649	10,529,056	17,337	2,722,032	3,911,663	15,098,155	35,495,892
1927	2,806,486	9,627,734	18,051	2,770,271	3,742,445	13,914,044	32,879,031

Production of Wrought Pipe and Seamless Steel Tubes, Including Boiler Tubes, Gross Tons, in 1927

Kinds of Pipe or Tubes	Lap Weld and Butt Weld Pipe or Tubes—Gross Tons			Seamless Pipe or Tubes—Gross Tons		
	Iron	Steel	Total Welded	Hot Finished	Cold Drawn	Total Seamless
Black, standard	65,712	1,172,071	1,237,783	13,628	689	14,317
Galvanized	41,765	446,467	488,232	2,030	.....	2,030
Oil country goods	19,583	1,180,353	1,199,936	560,309	693	561,002
Mechanical tubes	.....	.....	.....	16,219	78,947	95,166
O.D. & miscellaneous	.....	144,515	144,515	6,201	28,219	34,420
Boiler tubes	11,898	35,087	46,985	127,583	29,622	157,205
Total	138,958	2,978,493	3,117,451	725,970	138,170	864,140

Production of Wrought Pipe and Boiler Tubes, 1922-1927

Years	Black Standard	Galvanized	Oil Country Goods	O.D. and Miscellaneous	Boiler Tubes	Total Gross Tons
1922	1,061,060	390,140	1,139,834	66,775	74,427	2,732,236
1923	1,377,347	457,915	1,358,889	65,831	91,041	3,351,023
1924	1,080,432	454,019	1,183,867	50,046	55,892	2,824,256
1925	1,232,375	548,567	1,018,302	168,519	62,778	3,030,541
1926	1,377,747	526,101	1,328,294	109,520	60,853	3,402,515
1927	1,237,783	488,232	1,199,936	144,515	46,985	3,117,451

Production of Seamless Steel Tubes, Gross Tons, 1922-1927

Years	Hot Finished	Cold Drawn	Total	Years	Hot Finished	Cold Drawn	Total
1922	120,652	137,183	257,835	1925	403,965	164,225	*568,190
1923	202,669	201,114	403,783	1926	620,936	154,393	*775,329
1924	131,758	129,399	261,157	1927	725,970	138,170	*864,149

*Includes 162,294 tons of seamless steel boiler tubes in 1925, 174,000 tons in 1926, and 137,205 tons in 1927. Figures for prior years not available.

Production of Cast Iron Pipe, Net Tons, 1922-1927

Years	Gas and Water*	Soil and Plumbers	Total	Years	Gas and Water*	Soil and Plumbers	Total
1922	926,577	356,872	1,283,449	1925	1,414,252	510,483	1,924,735
1923	1,134,059	432,828	1,566,887	1926	1,534,278	469,228	2,003,506
1924	1,365,272	476,078	1,841,350	1927	1,488,644	553,871	2,042,515

*Includes culvert pipe.

Production of Hammered Charcoal Iron Blooms, Billets, Etc.

Years	For Sale	For Own Use	Total Gross Tons	Years	For Sale	For Own Use	Total Gross Tons
1920	2,731	59,893	62,624	1924	1,702	27,081	28,783
1921	2,871	23,208	26,079	1925	1,571	29,402	30,973
1922	1,624	39,377	41,001	1926	2,147	29,545	31,692
1923	3,522	47,021	50,543	1927	222	17,663	17,885

Production of Plates and Sheets by Kinds, 1926-1927

Kinds	1926—Gross Tons			1927—Gross Tons		
	Iron	Steel	Total	Iron	Steel	Total
Universal plates*	5,543	1,402,004	1,407,547	2,704	1,241,845	1,244,549
Sheared plates—						
Rolled on single stands	211	2,193,071	2,193,282	74	1,888,134	1,188,208
Roughed and finished on separate stands	.....	600,353	600,353	0	588,053	588,053
Black sheets rolled on sheet or job. mills	4,645	4,232,834	4,237,479	4,726	3,974,311	3,979,037
Black plates, including black plates for tinning and black plate specialties rolled on tin mills	.....	2,090,395	2,090,395	0	1,927,887	1,927,887
Total	10,399	10,518,657	10,529,056	7,504	9,620,230	9,627,734

*Include flats or bars over 6 inches wide.

Production of Merchant Bars, Showing Iron and Steel Merchant Bars Separately, Gross Tons, 1906-1927

Years	Iron	Steel	Total	Years	Iron	Steel	Total
1906	1,481,348	2,510,852	3,992,200	1917	983,926	5,226,031	6,209,957
1907	1,440,356	2,530,632	3,970,988	1918	846,898	5,395,851	6,242,749
1908	685,233	1,301,405	1,986,638	1919	446,549	3,945,075	4,391,624
1909	952,230	2,311,301	3,263,531	1920	663,032	5,467,208	6,130,240
1910	1,074,163	2,711,568	3,785,731	1921	198,324	1,367,430	1,565,754
1911	835,625	2,211,737	3,047,362	1922	317,665	3,660,993	3,978,658
1912	944,790	2,752,324	3,697,114	1923	404,730	5,148,066	5,552,796
1913	1,026,632	2,930,977	3,957,609	1924	258,737	4,022,184	4,280,921
1914	563,171	1,960,460	2,523,631	1925	290,488	5,368,827	5,659,315
1915	657,107	3,474,135	4,131,242	1926	252,437	5,221,399	5,473,836
1916	993,948	5,236,354	6,230,302	1927	187,995	4,682,252	4,870,247

Statistics are not available prior to 1905.

Production of Concrete Bars, Showing Iron and Steel Concrete Bars Separately, Gross Tons, 1910-1927

Years	Iron	Steel	Total	Years	Iron	Steel	Total
1910	4,645	236,464	241,109	1919	2,295	416,726	419,021
1911	2,388	256,353	258,741	1920	698	571,747	572,445
1912	2,500	271,832	274,332	1921	1,094	226,134	227,228
1913	113	319,557	319,670	1922	696	575,120	575,816
1914	.....	288,471	288,471	1923	368	680,499	680,867
1915	.....	353,408	353,408	1924	507	655,615	656,122
1916	2,683	458,717	461,400	1925	1,195	818,392	819,587
1917	1,497	469,687	471,184	1926	1,649	814,180	815,829
1918	468	344,152	344,620	1927	2,428	813,585	816,013

Statistics are not available prior to 1909.

Production of Iron and Steel Black Plates for Tinning 1904-1927

Years	Gross Tons	Years	Gross Tons	Years	Gross Tons
1904	472,569	1912	982,197	1920	*1,449,330
1905	507,587	1913	827,266	1921	*786,962
1906	576,079	1914	938,181	1922	*1,266,652
1907	504,072	1915	1,093,345	1923	*1,498,830
1908	513,771	1916	*1,274,137	1924	*1,415,182
1909	606,482	1917	*1,505,338	1925	*1,632,236
1910	712,137	1918	*1,489,586	1926	*1,761,944
1911	798,598	1919	*1,144,601	1927	*1,657,215

*Does not include black sheets rolled on sheet mills and used in the manufacture of long terne plates.

products came within ¼ per cent of the record-breaking total of the preceding year. Tin plate made its second largest total, having been exceeded only in 1926 and by less than 7 per cent. Seamless tubes made a new high record, as did also cast iron pipe. The latter exceeded the total of 1926 by less than 2 per cent, but the seamless tubes were almost 12 per cent ahead of the previous record, made in 1926.

Production of Heavy and Light Structural Shapes, Gross Tons, 1916-1927

Years	Heavy Shapes	Light Shapes	Total	Years	Heavy Shapes	Light Shapes	Total
1916	2,649,961	380,003	3,029,964	1922	2,337,026	381,742	2,718,768
1917	2,575,810	534,190	3,110,000	1923	2,917,446	487,751	3,405,197
1918	2,438,126	411,843	2,849,969	1924	2,805,084	478,624	3,283,708
1919	2,136,424	477,612	2,614,036	1925	3,049,817	554,313	3,604,130
1920	2,741,120	565,628	3,306,748	1926	3,330,572	581,091	3,911,663
1921	1,082,727	189,897	1,272,624	1927	3,083,211	659,234	3,742,445

Production of Wire Rods, Gross Tons, 1896-1927

Years	Tons	Years	Tons	Years	Tons	Years	Tons
1896	623,986	1904	1,699,028	1912	2,653,553	1920	3,136,907
1897	970,736	1905	1,808,688	1913	2,464,807	1921	1,564,320
1898	1,071,683	1906	1,871,614	1914	2,431,714	1922	2,654,741
1899	1,036,398	1907	2,017,583	1915	3,095,907	1923	3,075,992
1900	846,291	1908	1,816,949	1916	3,518,746	1924	2,522,545
1901	1,365,934	1909	2,335,685	1917	3,137,138	1925	2,944,484
1902	1,574,293	1910	2,241,830	1918	2,562,390	1926	2,722,022
1903	1,503,455	1911	2,450,453	1919	2,538,476	1927	2,770,271

Small quantities of copper-clad steel wire rods are included.

Production and Shipments of Portland Cement in Close Balance

Production of Portland cement in April is reported by the United States Bureau of Mines at 13,468,000 bbl., representing a seasonal advance from the 10,223,000 bbl. of March. The figure is about 4 per cent under that for April, 1927, at 14,048,000 bbl. Shipments in April were 13,307,000 bbl., being within about 1 per cent of production. As a result, the increase in stocks at the end of the month was very slight, the total having been 27,605,000 bbl. This figure is the highest in considerably more than a year, but should decline seasonally every month until November.

For the first four months of the year production amounted to 42,256,000 bbl. This is a new high record for the first third of a year, having displaced the previous record of 41,133,000 bbl. made in the first four months of 1927.

American Share of the Automobile Industry in 1927

Numerous facts regarding the automobile industry are covered in the 1928 edition of "Facts and Figures of the Automobile Industry," issued by the National Automobile Chamber of Commerce, 306 Madison Avenue, New York. The publication covers 96 pages, including a number of diagrams and a wealth of statistical material.

Among the other pertinent facts brought out, it is shown that at the end of last year there were 23,127,315 motor vehicles in the United States, of which 2,896,886 were trucks. Production in the year is given as 3,573,671 units, of which 487,653 were trucks. Of the passenger cars, 83 per cent, representing 2,555,223 units, were closed cars. The wholesale value of vehicles and parts is given as $4,274,800,743. More than one-third of this total represents replacement parts, accessories and tires. Production figures, including values, are for the United States and Canada. Exports of automobiles from the United States are given as 461,124 units and the value, including parts, accessories and tires, was $449,277,117.

One innovation in the book this year lies in the fact that the heads of tables are expressed in French, Spanish and German, as well as in English. This international feature is emphasized by a two-page table showing the number of passenger cars, buses, trucks and total motor vehicles in about 150 countries and colonies. The total for the world as of Jan. 1, 1928, is given as 29,505,475, of which 78 per cent is in the United States. Our proportion of the passenger cars is rather higher than this, being slightly above 80 per cent. In buses we have less than half the total, with 46 per cent. In trucks we have about 68 per cent of the aggregate.

As to production, the United States in 1927 registered 81.6 per cent of the total. The world aggregate is given as 4,151,449 vehicles, of which trucks and buses accounted for 575,848. Great Britain stands second as a producing nation, with 5.5 per cent, France being third with 4.6 per cent, and Canada fourth with 4.3 per cent. None of the other countries reached 2 per cent of the total.

Declining Stocks of Industrial Coal

Bituminous coal in the hands of commercial consumers in the United States on April 1 is estimated by the Bureau of Mines at 48,300,000 net tons. This represents a decline of 3,200,000 tons, or 6 per cent, from the corresponding figure of Feb. 1. It is the lowest recorded figure since Oct. 1, 1926. A year ago, in anticipation of a coal strike, the stocks had been built up to the unprecedented figure of 75,000,000 tons. Monthly declines from that total have been almost uninterrupted.

Estimates of the National Coal Association place the production of bituminous coal in the week ended May 5 at 8,100,000 net tons. This is about 1 per cent less than the figure for the preceding week, as reported by the United States Bureau of Mines, but is 2½ per cent higher than the total for the week ended April 21.

Employment Conditions Good in Ohio

April employment in the machinery industry of Ohio was the highest since June, 1927, according to the current bulletin of the Bureau of Business Research, Ohio State University. Reports from 182 companies comprising machine tool manufacturers, builders of electrical machinery, foundries and machine shops put the index figure at 102, with an average month in 1923 taken as 100. Dayton with 152, Cincinnati with 106 and Cleveland with 101 were the centers employing the highest percentage of wage earners. In the first four months of 1928, however, employment was 6 per cent less than in the same months last year.

In the iron and steel industry the index fell one point in April, to 101, and the average employment during the first four months of the year was 1 per cent under that in the same period of 1927. Manufacturers of automobiles and parts employed 5 per cent more workers in April than in March, but 13 per cent less than in April, 1927. In the non-ferrous metal group the number of employees in April was 13 per cent greater than in the same month last year. With 569 companies reporting from all industries, manufacturing employment in Ohio during April stood at 102, the same figure as in March.

The Department of Practical Mechanics, Purdue University, Lafayette, Ind., will offer a nine-week course in welding, beginning June 14. Applications will be filed in the order in which they are received, up to the capacity of the laboratories and the equipment.

British Buyers Await Lower Prices

Reduction Expected Soon—Continental Markets Advancing—British Mill Dismantled for Shipment to Australia

(*By Cable*)

LONDON, ENGLAND, May 14.

CLEVELAND pig iron is rather more active and makers are anticipating increased export demand with Continental costs increasing. Cleveland output is restricted and prices are being maintained.

Hematite is quiet and selling prices are said to be below cost, but demand is insufficient to enable makers to advance quotations. Foreign ore is dull. Renewed efforts have been made to end the Swedish miners' strike this week.

Finished steel is dull, particularly for export and in the shipbuilding trades. Domestic consumers are moderately busy, but buyers generally are waiting on the steel makers' meeting Wednesday, May 16, when, it is believed, lower prices may be adopted. There is an inquiry from the United States for more than 125,000 tons of welded steel pipe.

Tin plate activity continues and works are heavily sold for several months. Consumers at home and abroad have bought freely and there are important inquiries in the market. Galvanized sheets are dull and black sheets quiet.

Baldwins, Ltd., is dismantling the heavy mill and rolling gear of the Margam works at Port Talbot, erected during the war, and shipping it to Australia for re-erection at the new plant of the Australian Iron & Steel Corporation in which Baldwins, Ltd., and Dorman, Long & Co. are interested.

April exports of pig iron totaled 28,174 tons, of which 50 tons went to the United States. The total exports of iron and steel were 344,333 tons.

Continental iron and steel prices are strong as a result of the advance in German miners' wages, higher priced ore and the stoppage of Rhine traffic. Continental works are reported to be well booked with orders, but little of the business has passed through the hands of traders in this country.

GERMAN EXPORT TRADE BETTER

Domestic Business Also Active as Consumers Increase Stocks—Coal Exports May Be Restricted

BERLIN, GERMANY, April 28.—Business conditions are considerably better, partly because of seasonal activity. The improvement, however, extends to branches of industry in which there is not much seasonal fluctuation in trade. The total number of unemployed had declined by April 15 to 997,000, compared with 1,600,000 Feb. 15. Only 5 per cent of the members of the metals labor unions are reported without employment. There is a growing belief that the business reaction that was expected to develop as a result of the activity in 1926 and 1927 will not prove so serious. While manufacturers of finished products report a smaller volume of business, producers of semi-finished or raw materials in all fields are as well booked as at any time in the past two years. The Institute for Study of Trade Statistics points out that the present satisfactory situation is the result of increasing export orders, which have offset the moderate decline in domestic consumption.

Allowing for the rise in prices, export trade is virtually back to the pre-war level. In March, for the first time since the war, total exports, exclusive of precious metals, were in excess of 1,000,000,000 m., and the monthly average, since Jan. 1, has been 942,000,000 m.

Coal Exports to Be Reduced

The Ruhr coal dispute has not yet been settled. The Ministry of Industry has declared that the decision providing an 8 per cent increase in miners' wages will be enforced. The operators have decided temporarily to reduce exports of coal, on which there is a loss, and this is expected to react to the advantage of Great Britain and Poland. The total amount of the reduction in exports will be decided as soon as the producers ascertain the amount of increase that the Federal Coal Council will permit in domestic prices. Application for an increase

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	17½s.				$4.27		
Bilbao Rubio ore*	1	2½				5.48		
Cleveland No. 1 fdy.	3	8½				16.56		
Cleveland No. 3 fdy.	3	6				16.07		
Cleveland No. 4 fdy.	3	5				15.83		
Cleveland No. 4 forge	3	4½				15.71		
Cleveland basic (nom.)	3	5				15.83		
East Coast mixed	3	9	to	3	10	16.81	to	17.05
East Coast hematite	3	10½				17.17		
Rails, 60 lb. and up	7	15	to	8	0	37.75	to	38.96
Billets	6	0	to	6	10	29.22	to	31.66
Ferromanganese	13	15				66.97		
Ferromanganese (export)	13	0	to	13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	17½				28.61		
Tin plate, base box	0	18½	to	0	18⅝	4.51	to	5.02
Black sheets, Japanese specifications	13	5				64.53		
						C. per Lb.		
Ship plates	7	12½	to	8	2½	1.66	to	1.77
Boiler plates	9	2½	to	9	12½	1.98	to	2.09
Tees	8	2½	to	8	12½	1.77	to	1.99
Channels	7	7½	to	7	17½	1.60	to	1.71
Beams	7	2½	to	7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to	7	15	1.58	to	1.69
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	9	15	to	9	17½	2.12	to	2.14
Galv. sheets, 24 gage	13	0	to	13	2½	2.82	to	2.85
Cold rolled steel strip, 20 gage, nom.	14	0	to	14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):								
Belgium	£3	3s.				$15.34		
France	3	3				15.34		
Luxemburg	3	3				15.34		
Basic pig iron (nom.)								
Belgium	3	0	to	£3	1s.	14.61	to	$14.85
France	3	0	to	3	1	14.61	to	14.85
Luxemburg	3	0	to	3	1	14.61	to	14.85
Coke	0	18				4.39		
Billets:								
Belgium	4	15				23.14		
France	4	15				23.14		
Merchant bars:						C. per Lb.		
Belgium	5	10	to	5	12½	1.21	to	1.24
France	5	10	to	5	12½	1.21	to	1.24
Luxemburg	5	10	to	5	12½	1.21	to	1.24
Joists (beams):								
Belgium	4	17	to	4	17½	1.07	to	1.08
France	4	17	to	4	17½	1.07	to	1.08
Luxemburg	4	17	to	4	17½	1.07	to	1.08
Angles:								
Belgium	5	8				1.19		
⅛-in. plate:								
Belgium (a)	6	11				1.44		
Germany (a)	6	11				1.44		
¼-in. ship plate:								
Belgium	6	6				1.39		
Luxemburg	6	6				1.39		
Sheets, heavy:								
Belgium	6	1				1.34		
Germany	6	1				1.34		

(a) Nominal.

has been made, and some coal operators are urging that they be given entire freedom to fix prices, as prior to the war. They contend that the public has protection in the cartel regulations, which permit the Government to take action in case prices become unduly high, and in the keen international competition, foreign coal entering the country duty free.

The possibility of a coal strike has had the effect of reviving the iron and steel markets. As in December and January, when a lockout in the steel industry was threatened, consumers have been buying heavily to build up stocks before there is an increase in steel prices. Demand for steel bars, structural material, wire rods and sheets is active. In pig iron some producers who blew out furnaces recently, in expectation of a dull period, have more tonnage booked than they can supply at their current rate of operation. The present activity, however, is not expected to last long.

Deny That Export Rebates Are Bounties

A reply to a new American complaint that rebates paid to exporting manufacturers are equivalent to export bounties is published by the Essen *Bergwerks-Zeitung*, a daily publication for the steel industry. The substance of the reply is that Germany exports only at "world market prices," which are determined on the Brussels Metal Exchange, and that on some German products higher prices prevail than on the same products from France, Belgium or Luxemburg.

The recent quarterly report of the Vereinigte Stahlwerke A. G., Düsseldorf, showed that, except for pig iron, production in the first quarter exceeded that of the fourth quarter of last year. Unfilled orders on April 1 were 99.9 per cent of the unfilled tonnage on Jan. 1, but a larger percentage of the orders was for export shipment. The number of workmen employed April 1 was 182,014, compared with 182,235 on Jan. 1. Steel ingot output was 1,842,187 metric tons, compared with 1,831,538 metric tons in the final quarter of 1927, and pig iron production was 1,703,105 tons, compared with 1,725,719 tons in the last quarter of last year.

The Mannesmann Buizen Handels Matschappy has been established by the Mannesmann interests at Rotterdam to handle sales of pipe and tubing. The Linke-Hofmann Co., Breslau, the Sachsen Waggon Fabrik, Bautzen, and the Waggon Fabrik Busch, Bautzen, have negotiated a merger. With the exception of the Gorlitzer Waggonwerke, all the leading railroad car building companies of Saxony and Silesia have been consolidated.

FRENCH EXPORT PRICES FIRM

Mills Well Booked with Orders—British Pig Iron Still Offers Keen Competition

PARIS, FRANCE, May 4.—The export market, which during recent weeks was rather irregular, is again firm, and at the Brussels Bourse, April 25, the previous minimum quotations were not obtainable. On May 2, the price situation was even firmer. However, some foreign consumers, particularly those in the Far East, are unwilling to pay the prices now being asked, and it is reported that British and Continental exporters are, in a few cases, accepting orders speculatively at lower prices.

In some quarters it is believed that there will be a continuation of the present firmness in prices, and stress is laid upon the fact that, although the steel output of the first quarter of this year exceeded the allotments to all members of the International Steel Cartel by about 1,200,000 metric tons, prices are strong with an upward tendency. Another favorable factor in the present market is the tonnage of rail orders being executed by French mills. The domestic market has been quiet, probably as a result of the election, but prices continue firm.

Pig Iron.—Export prices show irregularity because of keen British competition, and as low as £3 7s. ($16.32), f.o.b. Antwerp, is reported to have been done on an order for 3000 tons of Cleveland foundry iron. Domestic foundry is fairly firm at £3 2s. to £3 2s. 6d. ($15.10 to $15.22) per metric ton, f.o.b. Antwerp. March output of pig iron was 858,000 tons, which constitutes a record, the highest previous production for one month, in December, 1926, having been 827,000 metric tons. Of the March production, 671,000 tons was basic, 109,000 tons foundry and 1000 tons forge iron. Included also was 35,000 tons of hematite foundry, 21,000 tons of hematite forge and Bessemer iron and 21,000 tons of ferroalloys. This record output was reached with 149 furnaces in blast, four more than at the beginning of the year and six less than were in operation in December, 1926. Demand for basic iron is increasing, but May purchases of foundry grade are expected to be smaller than in April, as foundries are less active.

Semi-Finished Material.—Prices for export are firm, with blooms at £4 2s. to £4 4s. 6d. ($19.97 to $20.58) per ton for large and medium sizes and £4 10s. to £4 12s. ($21.92 to $22.41) per ton for small sizes. Billets range from £4 11s. to £4 14s. ($22.16 to $22.90) per ton, f.o.b. Antwerp. Sheet bars are quoted at £4 14s. to £4 14s. 6d. ($22.90 to $23.02) per ton.

Finished Material.—Export prices are decidedly firmer and in some cases have advanced. Merchant bars are quoted, f.o.b. Antwerp, at £5 7s. 6d. to £5 8s. 6d. per ton (1.19c. to 1.20c. per lb.), an advance of 3s. (73c.) per ton in a fortnight. Standard beams are quoted at £4 13s. 6d. to £4 14s. (1.03c. to 1.04c. per lb.), an advance of 6d. (12c.) per ton. There has been practically no change in the domestic market situation. Merchants have been rather heavy buyers, but manufacturing consumers are inactive. Some important tonnages of bars and beams for public works are expected to be placed in May. Most mills are well booked with export tonnages of rails and merchant products, but there is some question that the present high level of production can be maintained. Export prices of sheets are firm, especially for the heavy gages.

Rails.—The base price on rails for the French railroads has been increased for second quarter to 820 fr. ($32.23) per ton, f.o.b. Eastern mills. The previous quotation of 755 fr. ($29.67) per ton had been effective since Oct. 1, 1927.

Luxemburg Export Trade Less Active, But Prices Are Firm

LUXEMBURG, April 29.—Foreign trade began to decline in March, and April has been quiet also. Prices, however, show no further downward tendency and are expected to continue unchanged. The French domestic market has been quite active.

British imports of European steel have declined and demand from the United States and from South and Central American markets has been less pressing. Japanese buying continues irregular. Slightly more activity is reported in the Chinese markets. Most Luxemburg producers are fairly well booked with business and are able to maintain an independent position on prices.

On April 1 there were 40 out of 47 furnaces in blast, and production in March totaled 240,234 tons of pig iron, compared with 220,114 tons in February. Steel ingot output was 220,309 tons in March, compared with 205,053 tons in February.

German Aluminum Works to Use New Electrolytic Process

HAMBURG, GERMANY, April 28.—Aluminum production of the Vereinigte Aluminiumwerke Lautawerk, one of the largest German plants, is being converted to a new electrolytic process under the Hagelung patents. This follows about three years of experiment with the Hagelung process, which is said to be as much as $27 per ton cheaper than the present method. As the new process uses clay, of which there are rich deposits in Germany, it will be no longer necessary to import large quantities of bauxite from British Guiana, Jugoslavja, France and Hungary.

BELGIAN MARKET IMPROVES

Steel Prices, Especially Bars, Show Advances—Pig Iron Quiet and Foreign Competition Keen

ANTWERP, BELGIUM, April 27.—Prices have strengthened, and the market is showing greater activity. Producers are well booked with business and are able to adopt an independent attitude. The market is especially firm on steel bars, with only a few mills openly soliciting orders and most of these limiting their quotations to certain sizes to complete rolling schedules. This has resulted in a division of orders among the various mills willing to accept certain sizes. Deliveries are becoming extended, and exporters are beginning to place their orders with mills without seeking concessions. Another favorable factor is the improvement in the French domestic market. German mills have taken some sizable orders in Holland, and export business, generally, is increasing, with foreign buyers seeking early deliveries.

Pig Iron.—Domestic business continues satisfactory and available supplies are limited. Export business is less active, the present quotation on phosphoric foundry of £3 2s. to £3 2s. 6d. ($15.10 to $15.22) per ton, f.o.b. Antwerp, apparently being too high to interest British consumers, who constitute the best available market. Thomas grade is unchanged for export at £2 15s. to £2 16s. ($13.40 to $13.64) per ton, f.o.b. Antwerp. Foreign hematite is still competing with the domestic product, which is quoted at about 650 fr. ($18) per ton, f.o.b. furnace. Iron and steel scrap prices have declined slightly in a quiet market. Heavy melting steel is quoted at 460 fr. ($12.80) per ton.

Semi-Finished Material.—Prices are decidedly strong and show an irregular upward tendency. The smaller specifications are bringing higher prices, with demand heavy and supplies small. Export business is slack. Blooms range from £4 1s. ($19.72) per ton for 8-in. to £4 10s. ($21.92) per ton for 4-in. blooms. Billets are quoted at £4 10s. ($21.92) per ton for 3-in. and £4 12s. ($22.41) per ton for 2-in. billets. Sheet bar prices are stationary at £4 13s. ($22.65) per ton, f.o.b. Antwerp.

Finished Material.—The general tendency of prices seems to be toward still greater strength, especially on steel bars. The further extensions in deliveries being offered by makers indicate that most mills are well booked with business. Exporters, evidently convinced that no immediate recession of prices is in prospect, are seeking to place their requirements. There is a fair demand from foreign markets, with buyers requesting early shipment. Bar prices have advanced to £5 7s. per ton (1.19c. per lb.), f.o.b. Antwerp. Structural rounds are reported no longer available from stock, and the current market is quoted at £5 5s. per ton (1.16c. per lb.). Beams are not so firm as other steel products, but have improved considerably, with the market at about £4 15s. per ton (1.05c. per lb.), f.o.b. Antwerp. Hot-rolled hoops are quoted at £6 per ton (1.32c. per lb.) f.o.b. Antwerp. Sheet prices are firmer, and mills show no inclination to seek heavy tonnage at the present market level.

Spain to Destroy Obsolete Textile Machinery

MADRID, SPAIN, April 28.—In a move to reduce the cost of textiles in Spain, the Spanish Government is reported to have ordered that textile machinery more than 40 years old be destroyed in one year and sold as scrap. To replace this equipment, it is understood that machinery may be imported duty free, provided the prices of the Spanish textile machinery builders are 10 per cent higher than those on imported machines. Under the decision the Government will pay a maximum premium of 1000 pesetas ($167.70) for each textile machine destroyed which was bought between 1890 and 1920, the amount of the premium depending upon the age of the machine. Large imports of textile machinery by Spanish manufacturers are expected as a result of the law.

Germans Actively Developing Welded Steel Construction

HAMBURG, GERMANY, April 28.—There has been considerable interest in the welded steel building of the Westinghouse Electric & Mfg. Co. at Sharon, Pa. The United Steel Works at Düsseldorf and other companies are devoting much time to further improvement of welding methods. In Berlin the Lehr und Versuchswerkstatten für Schweisstechnik, a special training school, has been established, where experiments will be made and engineers and workmen trained in welding procedure.

Japanese Plan 700,000-Ton Increase in Pig Iron Output

WASHINGTON, May 15.—Projected expansion of blast furnace capacity in Japan is calculated to add about 700,000 tons annual capacity, bringing the total for the entire country to about 2,500,000 tons, according to a report to the Department of Commerce from Tokio.

The projected expansion includes the installation of two 500-ton blast furnaces at the Imperial Steel Works plant at Yawata, a 500-ton furnace at the Anzin Steel Works in Manchuria, conversion of two of the three 100-ton blast furnaces at the Wanishi plant of the Japan Steel Works to 200 tons and 160 tons capacity, conversion of a 150-ton furnace at the Tsurumi plant of the Asano Shipbuilding Co. to 300 tons capacity and erection of a 200-ton furnace at the Kamaishi Iron Works.

This program, if executed in full, would meet the pig iron requirements of Japan and obviate the necessity of importing iron. The success of the projected expansion, however, is said to depend upon securing adequate supplies of iron ore. At present Japan is importing pig iron from India, Manchuria and Chosen.

German-Owned Polish Companies Merged

WASHINGTON, May 15.—A further step in the centralization of the Polish iron and steel industry appears in the recent announcement that the Oberschlesische Eisenbahn Bedarfs A. G. of Germany has brought about the amalgamation of the Friedenshuette Works, Baildon Foundry, Ferrum Co. and Graf Balestrom Co., all of Upper Silesia, and all for the most part German-owned, according to a report received from Warsaw by the iron and steel division, Department of Commerce. The new group, it is stated, will be the largest iron and steel organization in Poland, employing about 18,000 workmen and controlling iron ore and coal mines, foundries, rolling mills, by-product coke ovens and electrical power plants.

Immigrants Coming In Average 25,552 Monthly

Immigrant aliens to the number of 26,270 were admitted to the United States in March, an increase of 5382 over the previous month, but 3598 less than the number for March, 1927, according to the Bureau of Immigration. In the first nine months of the current fiscal year, a total of 229,969 immigrants entered the country, a monthly average of 25,552. This compares with 27,369 for the corresponding period of last year.

Of the 229,969 immigrants admitted from July to March last, the Mexican race contributed 42,213 and the German 39,820. The Irish were third in the list with 27,423, followed closely by the English with 26,685, while the Scotch numbered 17,965, French 14,169, Scandinavian 13,634, Italian 13,551 and Hebrew 8878. These nine races constituted 88.9 per cent of the total for the nine months. Skilled laborers admitted during this period totaled 44,582 and common laborers 26,375.

TESTING SOCIETY PROGRAM

Symposium on Wear Testing of Metals and Papers on Magnetic Analysis and Gray Iron Are Features

CONSIDERABLE valuable technical data will be presented at the various sessions of the thirty-first annual meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, June 25 to 29.

Following the usual plan the metal sessions are scheduled for the early part of the week, with concrete and other topics left for the later sessions. Monday, June 25, is devoted to committee meetings. On Tuesday, June 26, at 2 p. m., an opening general session is scheduled, at which Prof. H. F. Moore, professor of engineering materials, University of Illinois, Urbana, Ill., will deliver a brief address followed by reports of three committees: E-6 on papers and publications, E-9 on correlation of research and E-5 on standing committees. This will be followed by the announcement of the election of officers for the new year and the transaction of general business. The usual committee reports will be presented. Technical papers will be as follows:

Tuesday, June 26, 3 P. M.

Session on Wrought Iron and Cast Iron:

"A Study of Centrifugally Cast Pipe *versus* Sand Cast Pipe," by F. N. Menefee and A. E. White; report of sectional committee on specifications for cast iron pipe; "The Static and Fatigue Properties of Some Cast Irons," by J. B. Kommers; "Effect of Sulphur on Physical Properties of Gray Iron," by Edwin K. Smith and Fred B. Riggan.

Tuesday, June 26, 8 P. M.

Session on Testing and Wear Testing of Metals:

"Methods of Particle Size Determination," by Lincoln T. Work; "Calibration of Rockwell Hardness Testing Machines," by F. S. Mapes; "The Calibration of Extensometers," by R. L. Templin; "Measurement of Brittleness," by P. L. Irwin; "Wear and Other Properties of Some Railroad Bearing Bronzes at Different Temperatures," by H. J. French; "Wearing Tests of 12 Per Cent Manganese Steel," by J. H. Hall; "The Wearing Qualities of Tire Chains," by W. H. Parker.

Wednesday, June 27, 9.30 A. M.

Session on Steel and Magnetic Testing:

"Ferrous Silicates in Steel," by C. H. Herty, Jr., and G. R. Fitterer; "Tests of Specimens Cut from Different Parts of Structural Steel Shapes," by M. O. Withey; "The Incremental Permeability Method for the Magnetic Analysis of High-Speed Steel," by W. B. Kouwenhoven and Julian D. Tebo; "Endurance of High-Speed Cut-Off Tools in Relation to Magnetic and Other Measurements," by Haakon Styri.

Thursday, June 28, 9.30 A. M.

Session on Metals: Corrosion, Fatigue and Properties at Elevated Temperatures:

"Welding of Corrosion-Resistant Chromium Alloys," by W. B. Miller; "Some Factors Involved in Corrosion and Corrosion-Fatigue of Metals," by D. J. McAdam, Jr.; "Influence of Inhibitors and Accelerators on Corrosion-Fatigue of Metals," by F. N. Speller, I. B. McCorkle and P. F. Mumma; "Long-Time or Flow Tests of Carbon Steels with Particular Reference to Stresses Below the Proportional Limit," by J. J. Kanter and L. W. Spring; "Testing of Materials at Elevated Temperatures," by P. G. McVetty; "The Seizing of Metals at High Temperatures," by N. L. Mochel.

Thursday, June 28, 8 P. M.

Session on Non-Ferrous Metals and Metallography:

"Some Mechanical Properties of Nickel, Manganese-Nickel and Copper-Nickel Alloys," by W. A. Mudge and L. W. Luff; "Tension Tests of Copper with Varying Dimensions of Test Specimen," by C. H. Marshall.

The annual address of the president, Prof. H. F. Moore, and the annual report of the executive committee, will be presented Wednesday evening, June 27. The president's subject is "Hooke's Law of Stress and Strain—An Address Commemorative of the Two Hundred and Fiftieth Anniversary of Its Announcement."

Marburg Lecture and Dudley Medal

The third Edgar Marburg lecture will be delivered by Dr. Frank B. Jewett on "Some Research Problems Involved in Transoceanic Telephony." Doctor Jewett is president of the Bell Telephone Laboratories and vice-president of the American Telephone & Telegraph Co., New York.

The second award of the Charles B. Dudley medal will be bestowed on A. V. de Forest, research engineer American Chain Co., Bridgeport, Conn., for his paper on "A Method of Graphic Representation of Magnetic Characteristics," delivered last year. The award was established for recognition of meritorious papers on research in engineering materials, and was made this year on the unanimous recommendation of the medal committee: Dr. Zay Jeffries, chairman; P. J. Freeman and John H. Hall.

New International Association for Testing Materials

In response to the solicitation for applications for membership in the New International Association for Testing Materials, 82 individuals and 13 companies have applied for membership in the new association. The applications will be forwarded to the secretary of that body, Dr. M. Ros, Leonhardstrasse 27, Zurich, Switzerland, from whom applicants will receive a membership card in due course. The executive committee of the A.S.T.M. has appointed Past-President W. H. Fulweiler, chemical engineer United Gas Improvement Co., Philadelphia, to serve as the American member on the permanent committee of the international association, which is the governing body and consists of one member from each country having at least 20 members in the association. The permanent committee has started work on plans for the next international congress, which will be held in Zurich in 1931.

New England Foundrymen Discuss Gray Iron Institute

The dominating subject at the May meeting of the New England Foundrymen's Association, held Wednesday evening, May 9, at the Exchange Club, Boston, was the Gray Iron Institute. Charles F. Miller, president, introduced as the first speaker of the evening, H. S. Chafee, Builders Iron Foundry, Providence, R. I.

Mr. Chafee was the association's representative at the Pittsburgh and Cleveland meetings of gray iron foundries in connection with the proposal to form the Gray Iron Institute, and he presented to the members a thorough report of the proceedings, as well as an outline of what the institute purposes to be and do, and the cost to membership foundries. E. A. Custer, Jr., foundry engineer, Philadelphia, the guest of the association, went into detail as to the importance of the Gray Iron Institute to the industry. His talk prefaced an informal discussion on some of the recent improvements in gray iron foundries and on the use of permanent molds.

He told of Germans developing pearlitic iron; of their succeeding in interesting English and Danish foundries in it, but their failure to interest Americans, and added that those English and Danish foundries, making the product, have run full since its introduction.

He asked, "Why is it not possible to make a synthetic sand in this country that will eliminate much of our troubles?" Two years ago, he said, an Italian foundry announced it was operating on such sands, and it is known that France has foundries experimenting with them. Experiments also have been conducted at a Bridgeport, Conn., foundry.

Permanent or long-life molds, according to Mr. Custer, who started experiments with them in 1908, will never be a cure-all for foundry troubles, but they will materially help matters. The foundryman starting to use them, according to his own confession, must go through "a period of agony."

Gas Association Establishes a Fellowship to Study Cores

On May 1 the American Gas Association, through its committee on industrial gas research, F. J. Rutledge, chairman, established a fellowship at the University of Michigan, Ann Arbor, Mich., to make an intensive study of the many factors entering into the proper baking of cores. This research will be conducted at the department of engineering research under the supervision of H. L. Campbell, associate professor of shop practice. Prof. A. E. White is director of the department. Every factor affecting the application of heat in core baking will be investigated and fundamental facts established to determine the advantages of properly controlled atmospheres, temperatures and ventilation in core ovens.

Obtaining Clean Steel in the Ingot

British Iron and Steel Institute Studies Segregation— Notable Papers on Blast Furnace Work— Honors Talbot and Schwab

LONDON, ENGLAND, May 4.—Aside from an unusual number of contributions on various phases of blast furnace practice, the annual meeting of the Iron and Steel Institute, held in London yesterday and today, was most interesting to Americans because of signal honors extended to men well known in the United States. Benjamin Talbot, who spent many years in America, was inducted into the office of president of the institute, and Charles M. Schwab was awarded the Bessemer medal.

Mr. Schwab in his acceptance departed from the prepared address (reported in THE IRON AGE last week) and expressed his appreciation quite informally in a way that won the audience completely. Among other things he recalled a former meeting he attended 43 years ago with Captain "Bill" Jones, his friend and associate at Homestead.

"He sat next to your president, the noble Duke; I sat in the front row. The captain was a puddler. He was a native genius. He was a great master of iron and steel. His mixer is used in every steel works of the world. You were discussing at that time the plates for the great Firth of Forth bridge, which was then being built, and the president called upon the greatest American steelmaster then known for an expression of his opinion.

"It was a trying experience for him to speak before this assembly, because you are in your English meetings dignified, conventional and proper. The captain arose quite unperturbed, while I sat trembling in the front row wondering what sort of a speech this great American was going to make. The question was whether the holes for riveting the gusset plates should be drilled or punched. He got up and said just one sentence. He said 'Mr. President, you ask me whether I think these plates should be punched or drilled. All I have got to say is that any man that would punch a steel plate like that ought to have a good swift kick in the pants.' That was the whole of the captain's speech."

Schwab Says Selling Is Biggest Problem

A newly completed plant of the Appleby Iron Co. was described by A. Crooke and T. Thomson. This contains six blast furnaces, each making about 250 tons of pig iron per day from calcined ore. Gas is exploited to the utmost. No coke oven gas is available, but only about 450 lb. of coal per ton of ingots, beyond blast furnace fuel, is required for the entire plant. Three 250-ton and one 300-ton tilting open-hearth furnaces and one 500-ton mixer comprise the steel-making department. Labor is reduced to the minimum; production is 40 tons of ingots per man per week. Ingots weighing from 6 to 20 tons are made, and rolled down in a 42-in. blooming mill, a 120-in. and an 84-in. plate mill, all fully electrified. Mechanical devices at the shears enable three men to handle up to 60 tons per hour of ⅝-in. plate.

Mr. Schwab, in commenting on this plant, said that he did not feel that America deserved the credit it was given for efficiency, which, after all, has been made possible by quantity production. Taking a mill that runs continuously on one size of rods or sheets—if it were not possible to get good costs under those conditions, the designers would be pretty bad engineers. He had been asked about coming things in America. First of all he mentioned very large blast furnaces now being planned for a minimum of 800 tons of pig iron a day. About 1000 tons of pig iron can be obtained from such stacks, and as a result direct labor costs on blast furnaces are cut 35 per cent or more. The next great improvement that had been made is in the size of open-hearth furnaces; they were now making them very much larger than ever before, up to 250 and 300-ton heats, dividing the heats in the ladle and getting great economies. The chief change in the years to come, he said, would be the continuous rolling of sheets. Continuous mills have been able to show an economy of about $10 per ton in the cost of producing sheets.

He was ashamed to say that, with the vast investment of something like six billion dollars, American mills are not making much over 5 per cent on their invested capital. He thought the thing of the future was not the perfecting of costs in manufacture but the perfection of methods of distributing the steel so as to get a better price. A better return would come from some method of selling by which they would be first of all protected in their home markets for the chief consumption, and secondly distribute the surplus collectively in some manner that would comply with the law, and yet enable them to sell at a price that would give a profit on the capital invested. While it was exceedingly interesting to listen to technical discussions his mind, Mr. Schwab said, was constantly running on the matter of where they were going to get a better price for the steel.

Early Development of Continuous Process

In his presidential address, Mr. Talbot recalled that in 1890 he went to America to introduce the manufacture of basic open-hearth steel in the South. In going through various works there he found a great development in open-hearth basic practice going on. In his experiments in 1891-92 on refining iron in Alabama in fixed furnaces he had become interested in the tilting furnace, and had recommended the introduction of a large one to run continuously for desiliconizing the siliceous blast furnace metal by means of a basic slag instead of using an acid Bessemer converter for the purpose. Mr. Talbot selected Wellman's method of rolling forward instead of tilting centrally, as being the better for the purpose. In place of the cylindrical shape of the body of the furnace, as built at the Illinois steel works, they decided on a furnace with sloping sides. As it was decided to have close joints between the tilting sections, movable ports with water-cooled chills were used, capable of being moved backward and forward. The flared sides were for the double purpose of more easily repairing the back wall and slag line, and for holding the side walls (especially on the charging side) more firmly when tilting. The other interesting development in the continuous process was the bringing about, when desired, of the carbonic oxide reaction, in which the carbon in the bath is rapidly oxidized simultaneously with the phosphorus.

Segregation in Ingots

A 170-page report of a special committee studying heterogeneity of steel ingots was presented, describing work done in the two years since its first report. The earlier work was principally on killed carbon steel; more recent studies have been on alloy steels and effervescing steel.

Comparing analyses, sulphur prints and macrostructures of two acid open-hearth steel ingots containing 3 per cent nickel (cast from the same heat, but one nearly four times as large as the other), distinctly greater segregation was found in the bigger ingot. There is also a slight but definite segregation of nickel,

following the same general mode of distribution as carbon, sulphur and phosphorus, and comparable with manganese in a well killed steel. Nickel does not appear to have any influence on the degree of segregation, as observed in a similar plain-carbon ingot. The general mode is the same: a comparatively pure zone exists along the axis and toward the bottom; a high concentration at the top subdivides lower down so as to straddle the purer axis.

Two 2-ton ingots (C 0.29; Ni 4.4; Cr. 1.4) were selected from a heat, one poured in 4 min. at 1590 deg. C., and the other in 2 min. at 1550 deg. C. In each is a well defined outer layer of very small crystals. In the hot-poured ingot this merges into a region of columnar crystals, which tapers off toward the top; in the cold-poured ingot this region is lacking. Two important central zones occur in both: uniformly small crystals at the bottom, very large columnar crystals at the top. In the hot-poured ingot the latter exends half way down; in the other hardly a quarter way to the bottom.

Alloy steel ingots weighing 49 and 119 tons were also studied. Segregation is greater in degree in these large ingots. In the biggest one the maximum variation of nickel is about 5 per cent of the mean analysis: chromium varies 30 per cent, molybdenum 70 per cent (no analyses taken in the unsound sink head).

Many illustrations are given of sectioned low-carbon ingots of rising steel, showing the familiar sound skin, the zone of blow-holes just below and the top central unsoundness. The ingots ranged from 3 to 8 tons in weight, and were destined for tubes or plate. All show increased silicon in the lower middle portion. Carbon, sulphur, phosphorus and manganese segregate in the same manner and to about the same degree as in killed steel. All ingots show less distinct V segregates near the central axis; the inverted vee segregates found in piping steel do not show in rising steel but do appear in semi-killed ingots.

A 50-ton heat of basic open-hearth steel destined for free-cutting stock and containing but 0.03 per cent silicon, cast into ingots, had all the characteristics of killed steel as to segregation. No aluminum was used. One hundred and fifty pounds of sulphur and 450 lb. of ferrophosphorus, added to the ladle, effectively prevented gas evolution during solidification.

The report notes that casting temperature, rate of teeming, rate of solidification, and gas evolution during solidification are most important factors in the production of uniform steel. Some of them are modified by the mold design; others by the furnace practice. At present most of the knowledge concerning these matters is empirical rather than capable of scientific analysis and precise statement.

Blast Furnace Operation

From a study of over 120 blast furnace operating results, Edgar C. Evans and F. J. Bailey developed a method of correlating blast furnace data on a common basis. This method shows that, other things being equal, the greater the effective time of contact between the reducing gases and the ore before the hearth is reached, the lower is the fuel consumption. Much more carbon is required for external heat losses in the hearth than has previously been supposed, and therefore slow driving of the furnace is the least economical method of obtaining effective time of contact, since the external heat losses per ton of pig iron produced per unit of time are increased proportionately. External heat losses are inversely proportional to the hearth diameter, so that in furnaces having the same effective time of contact between reducing gases and ore small hearths are less economical than large.

In comment, A. K. Reese doubted the propriety of including data regarding obsolete or quite inefficient practices and attempting to deduce generalizations therefrom applicable equally well to more up-to-date operations. For instance, it would be quite questionable to assume an equal amount of carbon lost in solution before arriving at the tuyeres in all furnaces, as the authors did in deriving one of their formulas. Yet they appeared to have arrived at a number of conclusions which confirmed those which he had many times referred to as being essential if the best results were to be obtained, namely, that the preparation of materials is very important, as is their distribution and the lines of the furnace and coke quality.

D. Sillars commented on the attitude of the authors that certain changes had straight-line relations with one another, whereas operators know that no change in a blast furnace, and particularly in the hearth, has any straight-line relation with another. One change is followed by a change of another kind, generally obeying some sort of "law of diminishing returns."

E. H. Lewis said that one of the author's curves, showing the relation between moisture in the blast and iron production, was confirmed in his experience with excessively dry air. The curve shows that the best operation would not be had with absolutely dry air; some moisture helps the furnace. He believed that it would greatly benefit any blast furnace man to work out his own results in accordance with the author's curve, for it would give him a proper perspective of some of the varying factors in the blast furnace and enable him, through that proper perspective, to look over and find the causes of many of the irregularities which everyone found in blast furnace practice.

Africa's Blast Furnace

For some years an open-hearth plant has been in operation in the Transvaal, making a variety of steel shapes from steel scrap. But the supply of suitable scrap, although it looked large, was rapidly exhausted, and a blast furnace was erected at Newcastle, Natal, to produce necessary pig iron, and also to supply foundry iron to South African industries. J. E. Holgate and R. R. F. Walton described its construction and operation. Ore is hauled 60 miles, coke 50 miles, and flux 180 miles, but sufficient good water could not be secured any closer to the other raw materials. The furnace is 70 ft. high, has a 10-ft. hearth, and is driven to produce 125 tons of pig iron a day. The ore is a carbonate, 50 per cent iron, very low in sulphur, and contains 5 per cent of free carbon disseminated through it. It has been found more economical to charge it raw than roasted. Coke consumption is 1800 lb. per ton of pig iron, the gas is not dusty, it contains 28 per cent CO, and the top is very cold. Costs total to about $20 per ton, plus depreciation, interest and profit, and the furnace is able to meet foreign competition by virtue of the high freight charges into the district and a Government bounty on the iron produced.

Cleaning Blast Furnace Gas

V. Harbord read a paper entitled "A Comparison of the Most Important Methods Employed in the Cleaning of Blast Furnace Gas," in which he analyzed the work done and the costs at 12 different furnace plants employing five different systems. The figures show that, if gas no cleaner than 0.4 gm. per cubic meter is required, the Cottrell electrostatic cleaner is the cheapest. Lower dust contents require either a bag filter (Halberg-Beth) or a spray tower and disintegrator of the Theisen type. Bag filters can clean down to 0.025 gm. per cubic meter, but the labor cost of handling the dry, fine dust and disposing of it is high. With a final spray such gas can be delivered to engines with no more than 0.004 gm. solid per cubic meter. The corresponding figure is 0.025 for spray tower and Theisen washer; costs are highest on account of the large amount of power required for pumping and for driving the washer. Total costs (power, labor, materials and maintenance) range from 0.05c. per 1000 cu. ft. of gas cleaned in the electrostatic system to 0.2c. per 1000 cu. ft. for sprays plus Theisen washers.

Princess Furnace Sold for $21,850

Sale of the property of the Princess Iron Corporation at Glen Wilton, Va., to W. W. Zimmerman, of Clifton Forge, Va., for $21,850 has been confirmed by Judge Henry C. McDowell, United States District Court, Roanoke, Va. The Princess furnace, which had an annual capacity of 36,000 tons of foundry iron, was built in 1883-84 and rebuilt in 1912. The Princess Iron Corporation took over the property in 1918, and the furnace had been idle since October, 1921. J. H. Drewry was appointed receiver of the company in August, 1923. The furnace will probably be scrapped.

Heat-Treating Educational Conference

Metallurgists and Practical Treaters Hear Papers on Carburizers, Stainless Steels and Fatigue at Purdue University

METHODS of steel production and the application of special steels and their heat treatment were discussed at the second annual conference on steel treating held at Purdue University, Lafayette, Ind., May 10 and 11. The purpose of the two-day program was accomplished for it brought together many active plant officials, superintendents, metallurgists and foremen of steel treating departments for a well defined educational conference.

Problems Connected with Carburizers

Practical and theoretical problems were discussed in a paper entitled "Carburizing" presented by H. B. Northrup, metallurgist J. W. Kelly Co., Cleveland. Carburizing compounds should be reasonably free from dust and fines, so that gas circulation through the container will be assured and heating throughout the box will be uniform. Energizers, of which there are commonly three, may be used in any combination, but the amount and kind depend on the characteristics and depth of case desired at given operating temperatures. After usage, compounds should be exposed to the air for about 18 hr. so that the basic oxides formed during the operation may react with the carbon dioxide of the air and thus recarbonate themselves.

Carburization of steel is dependent on three essentials: temperature, time, and gas pressure. Temperatures employed usually run close to 50 deg. Fahr. above the upper critical range of the steel being treated. For any particular temperature chosen and with the use of a selected carburizing compound, there will be generated in the carburizing container a definite partial pressure of carbon monoxide, which will produce a case of definite depth and characteristics in a given time.

Electricity for Heating

It is not wise to overlook the use of electricity as a means of heat supply until it has been given every consideration, for in the final analysis the method of heat application that is most economical cannot be decided until after all factors have been carefully studied. Furnaces should be well insulated and constructed to withstand thermal strains. Uniformly carburized work can be obtained only with uniformity of hearth temperatures, which can be obtained by a survey of temperatures in various parts of the furnace and by manipulation of ports and burners.

Carburizing containers are important for the reason that gas pressure must be kept under control. Containers made principally of iron are inefficient because they warp and scale. Warpage defeats the purpose of fitting covers tightly, and scaling contaminates the compound and is therefore a direct cause of soft spots in carburized steel. Containers, the analysis of which is mainly nickel and chromium, give satisfactory service.

Preventing Carbon Penetration

Prevention of carbon penetration can be effected in five ways: (1) Electroplating in a cyanide bath; (2) electroplating in an acid bath; (3) painting with copper sulphate; (4) painting with prepared clay or kaolin base paints, and (5) daubing with fire clay.

The first two methods are the most commonly used because they are most positive. Soft spots may be caused by "copper migration," which may result from too high a current density in the copper-plating tanks. This results in inclusion of minute portions of the electrolyte, which are not removed by subsequent washing or scrubbing operations. Faulty or insufficient washing of plated articles allows the electrolyte to be carried over into the carburizing boxes, thus contaminating the carburizing compound.

Some New Stainless Alloys

"Stainless and Heat-Resisting Steel" was the subject of a paper by C. B. Callomon, metallurgical engineer Allegheny Steel Co., Brackenridge, Pa. He said that stainless steel usually contains from 12 to 16 per cent chromium, and that the higher the percentage of chromium, the higher the carbon content may be and permit the steel to retain its stainless properties. From the standpoint of commercial use the stainless qualities of iron and steel are among those least desired by users. Stainless iron and steel vary only in the carbon content, stainless iron being in reality a mild steel. Its tensile strength is derived not from carbon but from the chromium-iron combination. Stainless iron can be heat treated to a hardness of 400 Brinell, with a maximum tensile strength of 175,000 lb. per sq. in. Characteristics of this material are its ease of control and the uniform results obtained in heat treatment. At elevated temperatures, say at 1500 deg. Fahr., stainless iron has a tensile strength of 12,000 lb. per sq. in. and also still retains high fatigue values.

New Alloys Developed by Krupp

A new alloy, known as V2A, has recently been developed by the Krupps in Germany, said Mr. Callomon. It contains 17 to 20 per cent of chromium and 7 to 10 per cent of nickel. It cannot be heat treated, but it can be fabricated in almost any manner. It hardens rapidly under cold working and has a tensile strength of 90,000 lb. per sq. in. in the annealed condition. Cold rolling will increase the tensile strength to about 190,000 lb. per sq. in. It is subject to grain growth at higher temperatures, so that annealing must be limited to the range of 1800 to 2200 deg. Fahr. At higher temperatures this material becomes softer by the Brinell test, but the tensile strength remains about the same. When cold drawn, the tensile strengh is readily increased from 90,000 lb. per sq. in. to 300,000 lb. per sq. in., but at the higher figure the metal becomes quite brittle. It is non-magnetic.

The Krupps have also recently developed a heat-resisting material containing 8 to 12 per cent nickel and 24 to 26 per cent chromium, the remainder of the mixture being largely iron. The carbon in this alloy is kept low, and its heat-resisting qualities are equal to the nickel-chrome series. When hot rolled, it has a tensile strength of 130,000 lb. per sq. in., and it retains this tensile strength up to about 1700 deg. Fahr. Its thermal conductivity is low, being only about 28 per cent of that of soft iron. It makes an excellent carburizing container when formed in sheets and welded.

Calls Alloy Steels Automotive Steels

Alloy steel output represents about 2 per cent of the annual American production of ingots and steel castings, and fully 75 per cent of the alloy steel made is used by the automotive industry. Much of the remaining 25 per cent can be traced to industries dependent on automotive needs. E. C. Smith, assistant general superintendent Central Alloy Steel Corporation, Massillon, Ohio, in a paper on alloy steels, said that it might be considered fair to discuss alloy steels under the name of automotive steels.

Strictly speaking, he said, all steels are alloyed with something other than the essential ingredients, but common practice designates only those carrying un-

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This Issue in Brief

Reduces defective parts 50 per cent in less than a year by introducing waste budget plan. Each department of Stutz plant is allowed a stated amount each month for wastage and other controllable losses. Prizes are given to the foremen making the best showing.—Page 1378.

Era of consolidations is just beginning, says Montgomery Ward & Co. chairman. He predicts a great increase in the number of large units in business, owing to competition and the need for economy.—Page 1386.

Blisters on steel sheets are due to too little lime in the bath, one open-hearth superintendent believes. Others disagree, and give as reasons: too long a time in the pickling process, inclusions in the steel, and a sloppy-working furnace.—Page 1389.

Sees bright future for sponge iron. Already it is being used to advantage as a base for finer steels, such as wire steels, spring steels, razor blade steels, etc. It has superior workability, is free from red shortness, and in some cases reduces the cost of the finished product, sponge iron producer declares.—Page 1391.

Is steel output higher than demand warrants? Dr. Haney thinks so. His demand curve has gone down, while production curve has risen.—Page 1397.

By giving the scrap foreman a bonus, trouble resulting from non-ferrous metals and other impurities getting into open-hearth furnace has been almost wholly eliminated. Steel maker says he now has little difficulty with dirty scrap.—Page 1387.

Fatigue strength of metals may be roughly estimated as 250 times the Brinell number or one-half the tensile strength, says metallurgist. Fatigue failures in moving loads often have their origin in tool marks and other surface irregularities not visible to the naked eye.—Page 1429.

Price cutting is unsound and unethical, says Charles F. Abbott, who tells purchasing agents that if business is to be transacted on a basis of profit, manufacturers must adhere to a one-price policy.—Page 1429.

While population increased only 15 per cent in 10 years, the number of engineers increased 52 per cent. Low income is apparently due to an over-supply. If the unfit could be weeded out before or during their apprentice period, the situation would be remedied.—Page 1414.

You must scrap your old machinery, foreign government tells manufacturers. To reduce production costs, Spanish textile manufacturers are ordered to destroy all machinery more than 40 years old. New replacements may be imported duty free. Also, a premium will be paid for each machine destroyed which was bought before 1920.—Page 1405.

Not reduction of manufacturing costs, but perfection of distribution methods, so as to get a better price, is problem confronting steel makers, C. M. Schwab tells British industrialists. He bemoans the fact that American mills are not making much over 5 per cent on their invested capital.—Page 1407.

To get the best carburizing results, be sure your carburizing compounds are free from dust and fines. Otherwise the gas will not circulate freely through the container and the heating will not be uniform throughout.—Page 1409.

Sharp reduction in defective work is result of daily meeting of foremen for consideration of parts to be salvaged. In automobile plant the foremen meet each morning to examine all material branded as defective and to decide which pieces can be salvaged. Reduction of spoiled goods in his department becomes a matter of personal pride with each foreman.—Page 1378.

Copper content of steel scrap is steadily increasing, says open-hearth man. In making copper-bearing steel he finds that it is now necessary to add only half as much copper as formerly.—Page 1388.

If price-fixing is illegal, why is not selling at no profit equally illegal? association head inquires. Each practice is demoralizing, for public interest is just as seriously affected by one as by the other.—Page 1429.

Sloping back walls of open-hearth furnaces are a money-saver, says steel maker. After two years of use no bricks have had to be replaced, while previously repairs were necessary after approximately every 30 heats.—Page 1389.

Internal rolling stresses, caused by irregular drafting, are prevented by automatic roll settings in new structural steel mill. From the time the bloom leaves the bloom shear until the finished beam is delivered from the finishing pass, all operations are controlled by four men.—Page 1383.

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Trends in Non-Ferrous Metals

IN 1927 there was a sharp contraction in the consumption of most of the non-ferrous metals, but especially in copper, lead, tin and zinc. This was associated largely with the decline in automobile manufacturing and also was a reflection of the general recession in industrial activity. Even the manufacture of tin plate diminished and that industry has no close association with automobile manufacturing. Anyway, a consequence of several conditions was sharp declines in the prices for these metals. Copper stood up better than the others.

Recently there has been some revival in the markets. The sentiment in copper is quite good. In zinc there has been some improvement, especially since the producers have evinced the intention to become more restrained in their activity. The European producers at a meeting in Brussels on May 7 arranged a sort of a cartel among themselves. Even silver has been a little stronger owing to increased Chinese demand arising from disturbances in that country, which cause the Chinese to prefer to invest in silver rather than in other things.

A fundamental trouble with several branches of the non-ferrous metal industry of the world, as we have heretofore suggested, is the absence of adequate statistics. Of course, statistical information makes no magic formulas, but is simply a numerical expression of facts—that is, knowledge. The statistical knowledge in respect to copper is much superior, and therefore the copper producers are able to govern themselves more intelligently than others.

Our meaning is that the world's resources of copper, lead, tin and zinc, so far as known at present, will not last for a long period of time. The copper resources are better capable of measurement than are those of lead, tin and zinc, and we know that their present development is more extensive. There is no good reason, however, why copper producers possessing these resources should consider it necessary to liquidate them in the minimum of time, perhaps destroying all profit by excessive competition among themselves. Logical consideration points toward an opposite policy.

It is not necessary to have collusion among producers in order to develop such a policy. In its soundest development it will be a matter of individual action, determined by individual self-interest, but to arrive at such wisdom there must be knowledge.

Theoretically the same ideas should obtain for the other minerals—iron ore, coal, petroleum, etc. Practically, however, the world's resources of iron ore and coal are so great that no one figures upon a diminishing supply, it being left to future generations to worry on that score. In petroleum the condition is still different. The geologists tell us that the world's supply of it is relatively limited and that it will not be many years before its scarcity will become evident. Meanwhile there is a petroleum flood owing to the fear of producers, especially in the United States, that if they do not quickly drain their lands their neighbors will do it for them.

This condition in petroleum leads to a complicated chain of economic events. It gives us cheap gasoline and promotes the automobile industry. That in turn increases the use of all the metals. It adds to railroad income in many ways. And so on. But, on the other hand, it impairs the earning capacity of something like $11,000,000,000 that is estimated to be the American investment in petroleum production. This illustrates how closely is the interlocking of many of our great industries and how futile it is for the human mind to try to adjust and coordinate them as the Marxians have been essaying to do in Russia.

How to Make Things Dear

AS we have pointed out heretofore, no Senate investigation of the situation in bituminous coal mining was needed for the ascertainment of the industrial and economic facts. Any expert could have communicated them offhand in no time worth mentioning. But, of course, that is not the purpose of the senatorial investigation, which is rather to find some excuse for doing what John L. Lewis and his associates want to do; namely, to make coal dear. Consequently the cards are being shuffled preparatory to dealing some sort of pro-

posal for Federal control over bituminous coal mining.

Of the same nature is legislation that in several States is being enacted against chain stores, whose only crime is that, being more efficient and more economical than local merchants, they are able to sell goods relatively cheaply.

We might go further in a review of political complaint against efficiency and obstruction to the public enjoyment thereof, but it is unnecessary. That there should be such an attitude is rather to be expected in the pages of Alice in Wonderland than in those of the *Congressional Record.*

If we stop to think, however, it is an expression of resentment against economic law, or rather against the laws of nature, especially the law of the survival of the fittest, which a great ambit of thought, from philanthropological to socialistic, does its best to counteract. Instead of promoting fitness it leads us to foster the unfit, and as the latter multiply we increase our social problems. In economics and politics the prophets of unfitness preach a leveling down. Let the local grocer live at the expense of his neighbors and banish the chain store and mail order house. Let the superfluous coal mines share the work of the industry, considering that it is better for seven men to work four days a week than for five to work six days and two none at all. And so on.

Let there be no competition among human beings in their bread-winning, even if blackjacks have to be used to prevent it. Let no man or women be compelled to do what he does not desire, such as entering domestic service. This sounds rather like Soviet talk, and is different from the lesson that has been learned by those who have gone further on this line—British labor, for example.

The British labor unions, that erstwhile were socialistic in their thought, have straightened themselves entirely from that leaning, as appears in a recent report by their general federation on the causes and cure of unemployment. In this it is declared very frankly, and with simple good sense, that the cause of hard times cannot be the capitalistic system, as is proved by the fact that the most poverty-stricken country is Russia, where capitalism has been abolished, while the most prosperous country is the United States, "which is the most capitalistic of all." Our senatorial committees might well ponder over this obvious conclusion and at least let things alone, even if they cannot bring themselves to promote industrial efficiency.

Lake Coal Rates Down Again

IT has been "off again, on again" with the freight rate differential between the northern and southern fields on lake coal. For years the differential was 25 cents, being increased to 45 cents on Aug. 10, 1927, by a reduction in the Pittsburgh rate from $1.66 to $1.46, approved by the Interstate Commerce Commission. Then the roads reduced the southern rate from $1.91 to $1.71 to counterbalance; the commission threw out the case; the Richmond injunction of April 14 was secured against the commission; the $1.71 rate was put into force April 20; and now the northern roads have filed 20-cent reductions making the Pittsburgh rate $1.26, to go into effect about June 20.

To the railroads the net result of this jockeying, bordering on a rate war, is a loss of 20 cents a ton revenue on the lake coal, amounting to $6,000,000 or $7,000,000 for a season. Coal shippers maintain the business will still be very profitable to the railroads. It is considered only a remote possibility that the commission will disallow the northern reduction now proposed, since it provides the 45-cent differential the commission approved last year.

Of course the Supreme Court's decision on the appeal from the Richmond injunction, expected late this year, will be of much interest; but there is room for doubt whether it will do much to clarify or interpret the Hoch-Smith resolution. The latter refers to all rates which may be found "unjust, unreasonable, unjustly discriminatory, or unduly preferential, thereby imposing undue burdens, or giving undue advantage," etc. When the Pittsburgh district had lost nearly all its lake coal trade and the ton-mile rates were approximately twice as large on Pittsburgh coal as on southern coal it is hard to see how the matter can be permanently placed outside the scope of the Hoch-Smith resolution.

The Pittsburgh district shipped about 2,500,000 tons of lake coal last year and year before, against 8,000,000 tons as late as 1923 and much more than that years earlier. Its participation in the trade will now increase by several million tons, the amount to be limited more by physical conditions of production than by bare marketing conditions. There will be further confusion as to the coal strike, defunct for several months except that a large number of men are still strikers, sustained in that position by some public sympathy, by misapprehension as to what the Senate investigating committee could or would do, and now by this rate change, which the strike leaders will try to claim should help the operators to pay the absurd wage scale the union continues to demand.

Perhaps with more employment offered there will be a stampede of union miners, or a migration of miners from southern fields to the Pittsburgh district. Affairs in coal have been a succession of surprises and the supply of the latter is probably not exhausted.

Gains in Hot Rolled Flats

BANDS, hoops, strips and sheets are distinct products as to origin and trade usage, but they fall into one general category. No absolute lines can be drawn between them except by making artificial distinctions, such as calling 12 gage and heavier a "band" and 13 gage and lighter a "hoop," while the official statistics do not even follow this distinction when they include cotton ties with bands. It is interesting, therefore, to follow the total tonnage production of the entire group. There was a decrease from 1926 to 1927 of 4.2 per cent in the total of flat products, whereas the decrease in all finished rolled iron and steel was 7.4 per cent.

It was for 1920 that the production of strips was first reported, and from 1920 to 1927 the group gained 36.6 per cent, against an increase of only 1.6 per cent in total rolled iron and steel. Steel ingot production gained 7.1 per cent in that period, but the proportion of rolled steel to ingots decreased and there was a large decrease in

rolled iron, and thus the rolling industry as a whole showed little gain.

The detailed comparison between 1920 and 1927 is made below, sheets being divided into 13 gage and lighter and 12 gage and heavier, while tin mill product not tinned, being essentially a sheet product, is included.

Output of Flat Products—Gross Tons

	1920	1927	Change
Bands	388,862	323,129	—65,733
Hoops	333,440	176,300	—157,140
Strips	586,524	1,318,419	+731,895
Sheets, 13 up	2,519,072	3,557,988	+1,038,916
Sheets, 12 down	367,329	421,049	+53,720
Tin mill black	246,816	270,672	+23,856
Total	4,442,043	6,067,557	+1,625,514

This is a case in which percentages are misleading. To say, from the figures, that 1920 to 1927 strips more than doubled—increasing 125 per cent—while sheets increased "only" 36 per cent is correct arithmetically, but is quite misleading as a comparison. When all rolled iron and steel increased only 1.6 per cent sheets did remarkably well to increase as they did. Strips may have gained a little by taking what would otherwise have been sheet tonnage, but they gained also from bands and hoops and they had a great gain by going into new products not previously made.

It is a common remark that the success of the wide strip mill, which is assumed, is likely to put many old sheet mills out of the running, but the 1920 to 1927 comparison does not support such a view. When sheet production has so increased in only seven years there must be a rapidly growing demand, while according to the production figures less than three-fourths of last year's sheet industry was in existence only seven years earlier. By no means is the whole sheet industry old.

Demand for these various classes of flat rolled material may reasonably be expected to continue to grow at the remarkable rate of the past few years. There will be changes, losses and abandonments, but there will be ample room for the great majority to survive.

Too Many Engineers?

COMMENTATORS on latter-day education are inclined to view with alarm the statistics gathered among various engineering alumni showing a pronounced drift to other occupations. A report from Lehigh University shows that five years after graduation 30 per cent of a class have abandoned engineering; in 15 years the figure has grown to 41.5 per cent and after 25 years to 56.5 per cent. This indicates, say they, that engineers have been driven from their profession by starvation wages.

This does not exactly follow. If one bears in mind the fact that any high school graduate has been able to enter some engineering school without any aptitude test other than scholastic, and that more than half of those entering are dropped or change their minds about continuing, before the four years in college are finished, it is rather surprising that as many as 70 per cent of the graduates survive five years' competition in the profession. Or, if we hold to the somewhat old-fashioned notion that advanced education is to broaden a man's mentality, to enable him to solve easier the problems he meets, to make him a better citizen, and to help him to get more satisfaction out of life, then we can be thankful that engineering education has not yet become so highly specialized and so like a trade school that the engineers are unable to turn their hands to other work when they find that engineering does not hold the expected rewards.

Put in other words, part of the men who drift out of engineering are failures as engineers. They ought never to have been admitted to a scientific school. Another part are open-eyed enough to see opportunities in other walks of life and flexible enough in mind and habits to make a change. The first classification should be reduced to the smallest possible figure. The second classification should increase, rather than decrease. It would tone up the body politic.

Much more pertinent data on the status of the engineer can be found in figures comparing salaries of various occupations. In New York City, for instance, the average pay of engineers in municipal departments is less than that of teachers or mechanics, and hardly half that of men in the law. Furthermore, the United States Census shows that from 1910 to 1920, while the population was gaining only 15 per cent, the number of engineers increased 52 per cent. In the same period the legal profession increased only 7 per cent and the building trades *decreased* 23 per cent. No wonder plasterers and bricklayers get the wages!

But even after discounting the figures by the number of low-grade draftsmen and engineering assistants undoubtedly included (even though their duties require no very advanced training), they reinforce the conclusion that engineering societies and schools would do well to follow the lead set by their professional brothers, the doctors and lawyers, and their unionized mechanics —namely, regulation of the number of apprentices. If entering freshmen students could be weeded out by more searching entrance test, both mental and physical, it would save an enormous amount of misspent energy on the part of those foredoomed to failure in engineering.

Such a plan would doubtless be resisted by certain so-called educators. But because it attacks the trouble at its roots it would be the quickest and best solution—far better than the palliative of licensing and of stiff professional qualifications to start out a few elect from a horde of misfit graduates.

Correspondence

To the Editor: I think the able paper of Eugene P. Thomas, in THE IRON AGE of May 10, should go far toward proving to the uninitiated that it is not criminal or un-American to purchase a foreign-made product.

No one can question that we are equipped to produce considerably more than we consume, and a really healthy condition of business, where all who want to work can find employment, cannot be brought about until we find markets abroad to take care of that surplus we cannot utilize.

As Mr. Thomas states, "if we want a growing export business, we must continue to buy from abroad, as Europe must sell to us if she is to have money to buy from us."

I commend the article on this subject on page 1309. Too many of the speakers on public platforms who advocate the discontinuance of purchases of foreign-made goods apparently do not realize the harm they are doing to real prosperity here.

GILBERT J. MACQUARRIE.

Boston, May 10.

P. L. & W. HEARINGS BEGIN

Proposed Extension Would Link Youngstown District with Ohio River

WASHINGTON, May 15.—Hearings were begun yesterday before C. V. Burnside, assistant director of traffic of the Interstate Commerce Commission, on the application of the Pittsburgh, Lisbon & Western Railroad to build two branches, totaling 41 miles, which would connect the Youngstown district with the Ohio River. The hearings also include the application of the Montour Railroad, a subsidiary of the Pittsburgh Coal Co., to acquire the outstanding capital stock of the Pittsburgh, Lisbon & Western. The Pennsylvania, Baltimore & Ohio and Pittsburgh & Lake Erie railroads are opposing the project, while it is being supported by the Youngstown Chamber of Commerce and steel companies in the Youngstown district.

Would Haul Coal from Pennsylvania and Steel from Youngstown

One proposed branch would extend from Smith's Ferry, Pa., on the Ohio River, to the present line of the P. L. & W. at Negley, Ohio, and the other from Mill Rock, Ohio, on the Present P. L. & W. to Youngstown and Struthers, Ohio. H. J. German, president of the Montour Railroad, describing the plans in detail, said it is contemplated to make more effective use of the Government's development of the Ohio River system, including the Allegheny and the Monongahela. It is proposed that the coal of western Pennsylvania will be moved down the river by barge to Smith's Ferry, there transferred to the projected railroad and moved into the steel manufacturing district of Youngstown and vicinity. The same railroad line, he pointed out, would then permit the movement of the steel products of the Youngstown territory back to the river for movement into the South and Southwest. The investment, it was stated, would be about $8,000,000. It was declared that the plan, if consummated, would better enable the steel manufacturers of the affected territory to compete in the markets of the South and Southwest and also allow greater use of the river for Pittsburgh district coal. Also, it was said, the new road would open up the intermediate territory, where there is situated an extensive clay producing district, the present chief market of which is the Youngstown district. Although only 25 miles from Youngstown, it was stated, this district has to ship by a two-line haul in order to reach that city.

Would Greatly Increase Coal Movements

Mr. German said that in the third year it is expected that the P. L. & W., with the new branches, will haul 2,500,000 tons of coal, as against 500,000 tons at present, and that in the fifth year the total will be 3,000,000 tons. It was estimated it would handle 1,000,000 tons of additional traffic, that the average haul would be 37.5 miles and the average rate 60c. per ton. Among large tonnages of coal that would be hauled, aside from shipments by the Pittsburgh Coal Co., it was said, is coal along the Monongahela River belonging to the Youngstown Sheet & Tube Co. The reserves of this company, it was stated, are estimated to be sufficient to last for 40 years. Reserves of the Pittsburgh Coal Co. were estimated to be enough for 50 years. It was stated that the Youngstown Sheet & Tube Co. now uses 1,500,000 tons of coal annually from along the Monongahela River, while the total coal requirements of the Youngstown district were placed at 8,000,000 tons yearly.

Simplified List of Metal Packages

WASHINGTON, May 15.—Five sizes of metal packages and one size of iron drums were approved of a list of 10 determined upon at a simplified practice conference here relating to containers for vegetable containers. The meeting was under the auspices of the Division of Simplified Practice, Department of Commerce, and was attended by manufacturers, distributers and organized users. The conference named Sept. 1, 1928, as the effective date for new production of containers under the approved recommendation, allowing until Jan. 1, 1929, for disposition of present stocks. The approved list follows: Iron drums, 110 lb.; metal packages, 45 lb., 16 lb., 8 lb., 4 lb., and 2 lb.

Second National Fuels Meeting in September

The second national fuels meeting will be held in Cleveland, Sept. 17-20. The fuels division of the American Society of Mechanical Engineers is planning a broad selection of subjects and speakers. Participation is not limited to the membership of the society.

COMING MEETINGS

May

American Foundrymen's Association. May 14 to 18. Annual meeting and exhibition, Commercial Museum, Philadelphia. C. E. Hoyt, 140 South Dearborn Street, Chicago, secretary.

American Steel and Heavy Hardware Association. May 22 to 24. Nineteenth annual convention, Copley-Plaza Hotel, Boston. Benjamin R. Sackett, 503 Arch Street, Philadelphia, secretary.

Associated Machine Tool Dealers. May 23 to 25. Annual meeting, Granville, Ohio. E. P. Essley, E. L. Essley Machinery Co., Chicago, secretary.

American Iron and Steel Institute. May 25. Annual meeting, Hotel Commodore, New York. E. A. S. Clarke, 75 West Street, New York, secretary.

National Association of Purchasing Agents. May 28 to 31. Inform-A-Show and thirteenth annual meeting, Muelenbach Hotel, Kansas City, Mo. George A. Renard, 11 Park Place, New York, secretary.

June

American Association of Engineers. June 4 to 6. Annual meeting, Hotel Hussman, El Paso, Tex. M. E. McIver, 63 East Adams Street, Chicago, secretary.

American Management Association. June 6 to 8. Production executives' conference, Hotel Statler, Buffalo. W. J. Donald, 20 Vesey Street, New York, managing director.

American Society of Mechanical Engineers. June 14 to 16. Oil and gas power division, Pennsylvania State College, State College, Pa. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

American Railway Association. June 20 to 27. Mechanical division, Million Dollar Pier, Atlantic City, N. J. V. R. Hawthorne, 30 Vesey Street, New York, secretary.

Association of Iron and Steel Electrical Engineers. June 25 to 29. Annual meeting, Stevens Hotel, Chicago. J. F. Kelly, 513 Empire Building, Pittsburgh, secretary.

American Society for Testing Materials. June 25 to 29. Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

Society of Automotive Engineers. June 26 to 29. Summer meeting, Chateau Frontenac, Quebec, Canada. C. F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

Iron and Steel Markets

Steel Buying Again Hand-to-Mouth

New Business Light, But Liberal Specifying Sustains Mill Output—Automobile Production Undiminished —Pig Iron Drops 50c. at Chicago

HAND-TO-MOUTH buying again prevails in the steel industry, following several months during which advancing prices encouraged forward contracting. The April decline of 463,000 tons in the unfilled orders of the Steel Corporation caused little surprise in the trade. It was recognized that strictly new business was light, since the latter part of March brought out heavy specifications, as well as the acceptance of liberal extensions of first quarter contracts.

Unfilled tonnage, to a large extent, measures the willingness of consumers to buy ahead, and, since the current price situation offers no incentive for unusual commitments, further sharp reductions in the total may occur without indicating proportionate declines in consumption. Even with the large drop in April, unfilled orders of the Steel Corporation were still 12 per cent higher than on April 30, 1927, and slightly above the level of two years ago.

The reduction of mill backlogs is commencing to cause some concern, but, to date, shipping orders, consisting principally of specifications against contracts, have sustained production at a virtually unchanged rate. The average for Steel Corporation plants has dipped only slightly under the 90 per cent operations maintained through most of the first third of the year. The rate of the leading Eastern steel company has actually shown a gain since April, now standing at well above 80 per cent of capacity. In the Chicago district, where output remains on a 95 per cent basis, specifications are the best in five weeks and sales, in contrast with reports from other market centers, are equal to shipments. Ingot production in the Greater Pittsburgh area continues at an 80 per cent rate.

New business in finished steel in most markets has been too light to give prices a severe test. Hot-rolled strip steel, particularly the wide material, has shown further weakness, selling as low as 1.75c., Pittsburgh, for 6-in. and wider, or $1 below the recent minimum. Pig iron prices also lack buoyancy, and in the Chicago district have declined 50c. a ton to $18, furnace.

The automotive industry remains a leading outlet for steel, specifying at an undiminished rate. Motor car builders with two or three exceptions have made no reduction in output, and present indications are that there will be no seasonal slowing down of operations before June 15. Some of the automobile companies have placed steel for their July production, and the Ford Motor Co. is taking an increasing tonnage of automobile body sheets, at the same time placing liberal orders for long ternes.

A good movement of metal furniture sheets, especially to builders of electrical refrigerators, emphasizes the support steel production receives from the minor, unclassified consuming lines.

Tin plate production is virtually at capacity, and optimistic expressions by can makers point to a good summer operation of mills. Output for the first half of this year will be much better than had been expected, since container manufacturers lately have added to their original specifications.

A late spring has delayed the movement of wire products into consumption, and distributers are still rather heavily stocked with material shipped by the mills in the first third of the year. Cleveland jobbers have reduced nail prices 10c. per keg for stock shipment and to $2.65, Cleveland, for mill shipment, the latter being the same price that most producers are quoting.

Water delivery of steel is a factor of growing importance on the Great Lakes. A Buffalo steel plant has inaugurated weekly boat shipments to Chicago.

The reduction of 50c. a ton on foundry and malleable pig iron by Chicago producers follows the invasion of that market by Lake Erie iron, shipped by boat and offered at Lake Michigan ports at $18, dock. Two cargoes totaling 3000 tons have already arrived at Chicago, and a third boat is on the way. Shipments will also be made from Buffalo to lower Lake Michigan.

Sales of foundry iron have been fairly large in some markets, totaling 19,000 tons at New York, 14,500 tons at Cleveland and 9000 tons at Cincinnati. In some measure this buying represents the interest of consumers in third quarter requirements. A noteworthy feature is that there is no slowing down in the demand for pig iron from the automobile industry. The American Rolling Mill Co. is inquiring for 25,000 tons of basic iron for its Butler, Pa., works. An unusual transaction was the exchange of 10,000 tons of pig iron by an eastern Pennsylvania maker for New Jersey ore of equivalent value to be furnished by a cast iron pipe company.

Ferromanganese has been advanced $5 a ton to $105, seaboard, by domestic producers and importers of English alloy. The new price applies on business for the remainder of the first half as well as for second half, but there was liberal coverage prior to the advance and it may not become fully effective for some time.

Copper producers have advanced prices ⅛c. per lb. to 14.37½c., delivered, following a week of heavy buying in which consumers took fully 37,500 tons.

THE IRON AGE composite price for pig iron has declined to $17.42 a ton, displacing last week's $17.50 as the year's low figure. The finished steel composite is unchanged at 2.348c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	May 15, 1928	May 8, 1928	Apr. 17, 1928	May 17, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.19	19.19	19.69	21.69
No. 2, Birmingham	15.50	15.50	16.00	18.00
No. 2 foundry, Chicago*	*18.00*	18.50	18.50	20.00
Basic, del'd eastern Pa	19.00	19.00	19.50	20.75
Basic, Valley furnace	16.50	16.50	17.00	18.00
Valley Bessemer, del'd P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	*18.00*	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	**105.00**	100.00	100.00	95.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	**36.00**	36.00	36.00	**36.00**
Bess. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	39.00
O.-h. billets, Phila	38.30	38.30	38.30	39.30
Wire rods, Pittsburgh	44.00	44.00	44.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.85
Steel bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, New York	2.19	2.19	2.19	2.19
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	2.00	2.00	2.00	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.80
Beams, Chicago	2.00	2.00	2.00	2.00
Beams, New York	2.14½	2.14½	2.14½	2.14
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	May 15, 1928 Cents	May 8, 1928 Cents	Apr. 17, 1928 Cents	May 17, 1927 Cents
Sheets, black, No. 24, P'gh	2.70	2.70	2.80	2.90
Sheets, black, No. 24, Chicago dist. mill	*2.80*	2.85	3.00	3.10
Sheets, galv., No. 24, P'gh	3.60	3.60	3.65	3.75
Sheets, galv. No. 24, Chicago dist. mill	3.70	3.70	3.85	3.95
Sheets, blue, 9 & 10, P'gh	2.00	2.00	2.10	2.25
Sheets, blue, 9 & 10, Chicago dist. mill	2.15	2.15	2.20	2.35
Wire nails, Pittsburgh	2.55	2.55	2.65	2.50
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.55
Plain wire, Pittsburgh	2.50	2.50	2.50	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.20
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.25
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$15.50	$15.50	$15.50	$15.50
Heavy melting steel, Phila.	13.50	13.50	13.50	14.00
Heavy melting steel, Ch'go	13.00	13.00	12.50	12.25
Carwheels, Chicago	13.50	13.50	13.50	14.25
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	16.00
No. 1 RR. wrot. Phila	15.00	15.00	15.00	16.50
No. 1 RR. wrot. Ch'go (net)	**11.75**	11.50	11.50	11.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.60	$2.90
Foundry coke, prompt	3.75	3.75	3.75	4.00

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	**14.37½**	14.25	14.25	13.12½
Electrolytic copper, refinery	**14.12½**	14.00	14.12½	12.75
Zinc, St. Louis	**6.05**	5.95	5.75	6.00
Zinc, New York	**6.40**	6.30	6.10	6.35
Lead, St. Louis	6.00	6.00	6.00	6.30
Lead, New York	6.10	6.10	6.10	6.65
Tin (Straits), New York	**52.50**	51.37½	52.75	67.00
Antimony (Asiatic), N. Y.	11.25	11.25	10.25	12.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Backlogs Being Steadily Reduced But Operations Remain High

PITTSBURGH, May 15.—Steel consumers continue to take shipments against old orders very steadily, and, while backlogs are being steadily reduced because new demands are moderate, steel works and rolling mill operations remain well up to the recent rate.

The automotive industry continues the largest single outlet for steel, and the products going into motor vehicles still are making the best showing in mill shipments. The oil industry is providing comparatively little tonnage and disappointment is expressed that railroad demands are not yet showing any measurable increase. The engagement of structural mills is heavier on account of old than new bookings. Tin plate demands are still very heavy and the showing of this product for the first half of the year will be much better than was expected earlier in the year, as in the past three or four weeks can makers have added to their original specifications.

There seems to be very little variation from year to year in the requirements of miscellaneous consuming industries; the fact that the steel industry as a whole is making so favorable a record probably is owing in no small measure to the sustained demand from the unclassified consuming sources, a notable one of which is the electrical refrigerator industry.

Ingot production for this and nearby districts still may be said to approximate 80 per cent of capacity. The steep decline in the unfilled obligations of the Steel Corporation in April occasions little surprise here, since it was pretty well understood that new business was light in April, following the acceptance of much additional business on first quarter contracts, and that the liberal specifications of late March against earlier contracts were responsible for the high rate of plant engagement. The experience of the independent companies has not been much different from that of the Steel Corporation. A lower rate of production seems likely before the end of the month, unless there suddenly develops a demand of size from some source that will change the present condition of shipments being in excess of new orders.

Sheet prices do not seem to have stopped declining, but new buying is so scant that it does not furnish much of a test of prices in general, and the market as a whole is quotable at the levels of a week ago.

The price of ferromanganese has been advanced $5 a ton, but this step appears to have been preceded by acceptance of additional business at the first half price. The effectiveness of the advance is probably delayed until well into the third quarter of the year.

Except for one good-sized inquiry for basic grade, the pig iron market continues lifeless.

Pig Iron.—The American Rolling Mill Co. is taking prices on 25,000 tons of basic iron for shipment to its Butler, Pa., works. Except for this inquiry, the market is as dull as it has been at any time recently. Sales are of one to two carloads, and at the prices that have ruled for some time. The large melters are well

covered by contracts; some of them have supplies sufficient to carry them well into the third quarter. Steel foundries serving the railroads have very little business and are very sparing buyers, not only of pig iron but all other raw materials.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.50
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	17.25
Low phosphorus, copper free	26.50

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—One producer of ferromanganese announced an advance of $5 a ton effective May 10, applying on new spot business and last half contracts, and other makers have since followed. It is early for a test of the new price, since very few consumers are not under contract until the end of June, and it is believed there was acceptance of additional business at $100, a day or two before the announcement of the advance. Most contracts are upon a requirement basis and, no doubt, specifications for June and July shipment will be heavy. Actual requirements are lighter, in keeping with the fact that ingot production is no longer being pushed to the limit. Users of spiegeleisen are pretty well under contract for the remainder of the year, and the arrangement in high content ferrosilicon is on annual basis.

Semi-Finished Steel.—A northern Ohio producer of sheet bars has taken a firmer attitude on prices for third quarter contracts, but makers here and in Youngstown, not having recognized lower prices made by the former, have no occasion to change their quotations at this time. The open market quotation for some time has been $34, Pittsburgh or Youngstown, and now it is $34, Cleveland, instead of $33, previously. Business no longer is subject to competitive bidding, and the compensation is in the flexibility of the private arrangements both as to duration and prices. It is not believed that much tonnage actually moves at the full public quotations. Tin mill operations are still high and the tin bar requirements are in keeping, but tapering sheet mill operations mean lighter specifications for sheet bars. There is still fairly active specifying for billets and slabs. Most of the movement of wire rods is at prices below what makers now ask, but there are a few releases against $44 contracts.

Bars, Plates and Shapes.—While strictly new business in these products does not amount to much, it is sufficient, with specifications against old orders, to provide a fairly large total and to restrain selling pressure. Little business is being done at more than 1.85c., base Pittsburgh, and that appears to be the top and bottom of the market, since there is very little difference in size between the releases of large users and the purchases of the small-lot consumers. A very fair amount of plate tonnage is appearing in river barge orders. Bar requirements are decreasing, and new fabricated steel business is quiet.

Rails and Track Supplies.—Business is only moderately active, but the action of the Northern railroads in reducing Lake coal freight rates 20c. a ton until Dec. 1 is expected to mean considerable Lake coal business for western Pennsylvania and southern Ohio mines, and probably forecasts heavier operations and a larger demand for light-section rails and small spikes, which have been very quiet in the past few months. Heavy deliveries of standard-section rails contributed to the big decrease in the unfilled orders of the Steel Corporation last month.

Wire Products.—The market is quiet. A late spring has somewhat deferred the movement into consumption and, as there were heavy shipments over the first four months of the year, distributers still are rather heavily stocked. Good weather will probably mean fresh demands upon the mills, but in the meantime prices now quoted, which are $2 a ton higher than those of the first quarter of the year, are largely untested. Larger producers are quoting nails at $2.65 base, per keg, Pittsburgh, and are insisting on that price, but there is considerable resistance to that quotation and producers lacking backlog business are quoting as low as $2.55 to secure orders. Consumers of plain wire in many instances were given permission to specify April and May requirements on first quarter contracts.

Tubular Goods.—The market generally is quiet, even sales of standard-weight pipe having slipped as a result of the fact that jobbers took advantage of the chance to specify for a month's supply before the advance of April 2 became effective and are now fairly heavily stocked. No improvement is noted in the demand for lap-welded pipe for oil country use, and pipe line orders are not reaching the mills in volume.

Sheets.—There is a fairly good volume of business in sheets, but seemingly it is not heavy enough to strengthen prices on the ordinary finishes. On black sheets 2.70c., base Pittsburgh, is fairly common and, while there are occasional sales as high as 2.85c., the small-lot buyer seldom has to go beyond 2.80c. Galvanized sheets generally are bringing 3.60c., but business is reported at above and below that figure. Blue annealed sheets still are quoted at 2c. and 2.10c. Automobile body sheets are firm at 4c., and the movement is good, with the Ford Motor Co. increasing its takings and also buying a good tonnage of long ternes for gasoline tanks. Metal furniture sheets also are moving well, a particularly strong demand being noted from the builders of electrical refrigerator cabinets.

Tin Plate.—Container manufacturers are taking shipments freely, and there are a few cases where they have exceeded their first half contract tonnages. Tin plate output remains substantially at plant capacity, and can makers talk so optimistically of the prospect that a good summer operation of the mills is looked for. No formal announcement of the price for last half tonnages is likely, but large consumers understand that the present price of $5.25 per base box, Pittsburgh, will be continued.

Cold-Finished Steel Bars.—Individual orders are small, but they are numerous and coming in steadily. There is no change in prices.

The Iron Age Composite Prices

Finished Steel

May 15, 1928, 2.348c. a Lb.

One week ago	2.348c.
One month ago	2.362c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

May 15, 1928, $17.42 a Gross Ton

One week ago	$17.50
One month ago	17.67
One year ago	19.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.42,	May 15
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mill	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.95c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.85c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.05c. to 2.10c.
6 in. and wider, P'gh	*1.80c. to 1.90c.
Narrower than 3 in., Chicago	2.30c. to 2.40c.
From 3 to 6 in., Chicago	2.10c. to 2.20c.
6 in. and wider, Chicago	2.00c. to 2.10c.
Cotton ties, f.o.b. Atlantic and Gulf ports:	
Carlots per 45-lb. bundle	$1.27
2000 bundle lots	1.25
Larger lots	1.23

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c.
Bars, f.o.b. Chicago	2.20c.
Bars, Cleveland	2.25c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.15c. to 3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3.00 to 3.10
Cement coated nails	2.55 to 2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.00c. to 2.10c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.15c. to 2.25c.
Nos. 9 and 10, del'd Cleveland	2.09c. to 2.19c.
Nos. 9 and 10, del'd Philadelphia	2.32c. to 2.42c.
Nos. 9 and 10, f.o.b. Birmingham	2.20c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.70c. to 2.80c.
No. 24, f.o.b. Chicago dist. mill	2.80c. to 2.90c.
No. 24, del'd Cleveland	2.84c. to 2.94c.
No. 24, del'd Philadelphia	3.02c. to 3.12c.
No. 24, f.o.b. Birmingham	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.00c.
No. 24, f.o.b. Pittsburgh, B grade	3.70c. to 3.80c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.65c.
No. 24, f.o.b. Chicago dist. mill	3.70c. to 3.80c.
No. 24, del'd Cleveland	3.64c. to 3.84c.
No. 24, del'd Philadelphia	3.92c. to 4.07c.
No. 24, f.o.b. Birmingham	3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.00c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating I.C.$11.2025-lb. coating I.C.$16.70
15-lb. coating I.C. 14.0030-lb. coating I.C. 17.75
20-lb. coating I.C. 15.3040-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

S.A.E. Series Numbers	Per 100 Lb.
2000 (1/2% Nickel)	$2.90
2100 (1 1/4% Nickel)	3.20
2300 (3 1/2% Nickel)	4.15
2500 (5% Nickel)	4.90
3100 Nickel Chromium	3.20
3200 Nickel Chromium	3.65
3300 Nickel Chromium	6.45
3400 Nickel Chromium	5.85
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	3.15
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	3.35
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	3.70
5100 Chromium Steel (0.60 to 0.90 Chrome)	3.00
5100 Chromium Steel (0.80 to 1.10 Chrome)	3.10
5100 Chromium Spring Steel	2.85
6100 Chromium Vanadium Bars	3.85
6100 Chromium Vanadium Spring Steel	3.60
9250 Silicon Manganese Spring Steel	2.90
Chrome Nickel Vanadium	4.15
Carbon Vanadium	3.60

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, 5/8 in. and larger	$2.80
Spikes ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
1/8	45	19½	1/4 to 3/8	+11	+39
1/4 to 3/8	51	25½	1/2	22	2
1/2	56	42½	3/4	28	11
3/4	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

1/8	41	24½	1/4 to 3/8	+19	+54
1/4 to 3/8	47	30½	1/2	21	17
1/2	53	42½	3/4	28	12
3/4	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅞ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Hot-Rolled Flats.—The market is holding very firmly on cooperage stock and is making a good showing as to prices on strips 6 in. and narrower, as most makers are well sold up on narrow material and are not particularly anxious for more business. Some makers find that price weakness exists principally in material wider than 12 in., where sheet and plate competition comes into play. Good releases are coming out against contracts, but strictly new orders are few.

Cold-Rolled Strips.—Specifications against contracts are good, but makers are not being asked to quote on many new inquiries, and order books are beginning to decline. The tonnage buyers are getting shipments at 3c. base (1 to 3 tons), while 3.15c. is the ruling small-lot base price.

Bolts, Nuts and Rivets.—Demand is steady, but is off somewhat in volume from that of last month and the month before. Prices are firm.

Coke and Coal.—Interest centers in the effect upon the coal market of the recently announced voluntary reduction by Northern railroads of 20c. a ton on coal moving to the Lake trade. This rate cut, which will become effective about the middle of June, restores the differential of 45c. between rates on Northern and Southern coal. It is expected to stimulate the market for western Pennsylvania coal and will probably mean more for the non-union mines than those formerly operated under agreements with the union, as it is generally believed that much difficulty would attend the starting of the former union mines. It is also believed that there will be coal enough and no material advance in prices. The market in both coal and coke still is very dull and prices do not show much strength. Spot furnace coke ranges from $2.50 to $2.75, but standard furnace fuel is not selling under $2.65. Spot foundry coke is quoted from $3.50 to $4.85, the latter for so-called premium brands, which recently were priced at $5.10.

Old Material.—Heavy melting steel this week ranges from $15 to $16, and scrap rails also are quotable up to $16. The steel and rails in the May list of the Baltimore & Ohio Railroad went on a direct bid to the same steel company here which took the offerings of those grades from that road's April list. The price was $15.85 to the road, while the buyer had to pay 15c. a ton additional freight from the nearest Baltimore & Ohio point to its plant. The $15 price is based on a good-sized sale to another Pittsburgh district mill, and there have been sales into consumption at another point at $15.25. Compressed sheets appear to be slightly easier, and $15 is all that now can be obtained for them in this district; supplies still are scant, but wants are smaller. The Ford Motor Co. last week sold 3000 tons of this grade at $11.10, Detroit, to a Buffalo melter. Machine shop turnings are a little stronger. There is no life to the demand for foundry grades, but short rails are stronger because of the higher prices ruling for uncut ones.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$15.00 to $16.00
Scrap rails	15.25 to 16.00
Compressed sheet steel	15.00
Bundled sheets, sides and ends	14.00
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	16.00 to 16.50
Heavy breakable cast	13.00
No. 2 railroad wrought	15.50 to 16.00
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	10.50 to 10.75
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.50 to 17.00
Railroad coil and leaf springs	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00 to 11.25
Short mixed borings and turnings	11.00 to 11.25
Cast iron borings	11.00 to 11.25
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 12.00
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	16.00 to 16.50
Malleable Grades:	
Railroad	15.00 to 16.00
Industrial	14.50 to 15.50
Agricultural	14.00 to 15.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, per 100 count	60 per cent off list
Carriage bolts, per 100 count	60 per cent off list
Nuts, all styles, per 100 count	60 per cent off list
Large rivets, base per 100 lb	$3.50
Wire, black soft annealed, base per 100 lb	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

REINFORCING STEEL

Awards of 4000 Tons—1400 Tons in New Projects

AWARDS of only 4000 tons reported in the last week included no jobs of outstanding size. New projects amounted to less than 1400 tons. Awards follow:

STATE OF NEW HAMPSHIRE, 300 tons of road mesh, to American Steel & Wire Co. and Truscon Steel Co.

CHICAGO, 165 tons, Willoughby Tower Building, to Concrete Engineering Co.

CHICAGO, 125 tons of rail steel, packing plant, to Calumet Steel Co.

CHICAGO, 850 tons, approaches to Crawford Avenue Bridge, to Barton Spiderweb System.

CHICAGO, 140 tons of rail steel, Temple Sholem, to Inland Steel Co.

CHICAGO, 700 tons of rail steel, apartment building, from Wahl Construction Co., general contractors, to Inland Steel Co.

CHICAGO, 500 tons, building for General Tire & Rubber Co., to an unnamed bidder.

CHICAGO, 100 tons, Ogden National Bank Building, to Olney J. Dean & Co.

STATE OF ILLINOIS, 300 tons of rail steel, road work, to Calumet Steel Co.

ST. LOUIS, 445 tons, 220 tons for apartment house at 4615 Lindell Boulevard and 225 tons for garage at Seventh and Morgan Streets, to Laclede Steel Co.

NASHVILLE, TENN., 120 tons, Victor Chemical Works plant, to Connors Steel Co.

ELLENSBURG, WASH., 270 tons, Kittitas Division of Yakima Project for United States Bureau of Reclamation, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

WORCESTER, MASS., 400 tons, telephone building.

NEW YORK, 200 tons, Pier No. 3, North River.

PHILADELPHIA, 125 tons, North Broad Street station for Reading Railroad; bids in.

CHICAGO, tonnage not stated, reconstruction of Fine Arts Building in Jackson Park.

EUGENE, ORE., 450 tons, penstock, dam and power house; bids June 5.

SEATTLE, 200 tons, Stimson Building; bids being taken.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	38.00
Forging, guaranteed	43.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $44.00
Screw stock	$5.00 per ton over base

*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.50 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.50 to 4.25
Foundry, by-product, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.05 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.25

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 2½
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10 and5
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.90
F.o.b. Chicago	3.00

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10 to 70
F.o.b. Cleveland	70 and 10 to 70
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex, head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Steel Specifications Best in Five Weeks—Foundry Pig Iron Reduced 50c.

CHICAGO, May 15.—Specifications for finished steel products are the best in five weeks and sales in the past seven days are fully equal to shipments and are on a par with the average in the closing weeks of April. Early in the spring the delivery situation and general business conditions led consumers to anticipate requirements beyond what had been their custom, but as the summer months approach there is a growing tendency to order in smaller lots. Steel mill output in practically all departments, sheets being an exception, remains steady. Although backlogs continue to dwindle, it is rather commonly believed by producers that the steel business enters the end of the fifth month in a stronger position than in any like period since 1923. Changes in blast furnace operation are only a matter of readjustment, there still being 28 out of 36 steel company stacks in blast in this district. No. 12 furnace was blown in at Gary on May 9 and No. 7 was taken out of service at South Works on May 12. The leading producer is now operating 11 furnaces at Gary, eight at South Works and one at Joliet. Chicago merchant iron has been reduced 50c. a ton.

Price concessions in finished steel are less common except in narrow plates. Competition for hot mill products is unusually keen, not alone among sheet makers but also with producers of strip sheets.

Pig Iron.—Producers of Northern foundry iron have reduced prices to $18, f.o.b. local furnaces, for the No. 2 grade. This change comes at a time when purchases are slow and iron is moving here by boat from Lake Erie ports. Two cargoes, about 3000 tons, have already been unloaded and a third boat is due to arrive before the end of the week. Shipments from Buffalo also are under way. Deliveries are steady and well ahead of production, which is now confined to three merchant stacks in the immediate Chicago territory. Southern iron sold locally brings $21.51 when shipped by all-rail and $20.68 when delivered by rail and barge. Scattered carload orders for charcoal iron bring $24, furnace, or $27.04, delivered, Chicago. The silvery market is quiet.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.50
Malleable, not over 2.25 sil.	18.00
High phosphorus	18.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	21.51
Southern No. 2 (barge and rail)	20.68
Low phos., sil. 1 to 2 per cent, copper free	$28.50 to 29.00
Silvery, sil. 8 per cent	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The local ferromanganese market has been active both in anticipation of and following an advance in price of $5 a ton. Chicago delivered prices are now $112.56. New prices have no bearing on old contracts, which expire June 30, and new agreements protect buyers against a drop in prices in the second half. A tonnage sale of 19 to 21 per cent spiegeleisen has been made at $30, Hazard, Pa. Small lots bring $32.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $37.76 to $39.76.

Plates.—Orders for oil storage tankage plates again play an important part in the Chicago market. A Texas producer of petroleum products has purchased 6000 tons to be fabricated in a Chicago shop. Two oil refiners, one in Louisiana and one in Texas, have come into the market for a total of 8000 tons. Bids will be opened June 1 in Denver, Colo., on a water pipe project requiring close to 12,000 tons, and the general contract has been awarded for a similar project at Oklahoma City, Okla., taking about 3000 tons. The railroad equipment market is quiet. Ten gas-electric cars have been placed by the Chicago, Burlington & Quincy. Large producers of plates in this district are well engaged, and as a general rule rolling schedules are satisfactory, but several mills of small capacity, and whose product usually runs to narrow widths, appear to be anxious to take business and are offering concessions in prices. As low as 1.90c., Chicago, has been named on a few scattered lots. However, 2c. is the ruling price, even in territory to the east, which for several weeks has shown unstable tendencies.

Mill prices on plates per lb.: 2.00c., base Chicago.

Structural Material.—At one source it is estimated that fully 100 projects tributary to local mills are pending and will require more than 1000 tons each, the aggregate being close to 200,000 tons. Probably a fair share of this, however, is of a speculative nature, and, if it does eventually go through, rolling and fabrication will be spread over many months. Outstanding among local awards is 1700 tons for a lift bridge across the Chicago River for the Baltimore & Ohio Railroad. Fresh inquiry is moderate in size and is well scattered over the Middle West. Swift & Co. will soon buy 600 tons for an office building at Kansas City, Mo., and the Interstate Iron & Steel Co., Chicago, will take 600 tons for an addition to a billet mill. Keen competition among fabricators continues to hold prices at low levels. On special jobs it is not uncommon for shops to solicit and get aid from steel producers in the form of price concessions. These same fabricators, in buying for stock or against less desirable jobs, commonly pay 2c., Chicago.

Mill prices on plain material per lb.: 2.00c., base, Chicago.

Bars.—Of interest in this market is an acceleration of buying, so that new bookings in mild steel bars are practically equal to shipments. The character of purchases is changing toward smaller lots and for the earliest possible delivery. In some instances it develops that users have fair stocks, and current orders are mostly to round out the sizes of bars on hand. Specifications from cold-drawn bar manufacturers are heavy, and warehouses are taking a larger part of the output. Notwithstanding reports of recessions in automobile manufacturing, this week has witnessed rather a sharp increase in demand for bars from that industry, forgers particularly being in need of additional stock. Farm implement plant requirements are lower, but there is evidence that these manufacturers will not hesitate to round out stocks in anticipation that as soon as the inventory period, about June 1, is over they will swing into near-capacity output. Less uneasiness is noticed in soft steel bar prices, it being evident that competition from the East is less active. The iron bar market is quiet both in sales and specifications. Prices are steady at 2c., Chicago. Alloy bar mills are engaged at close to capacity, and price schedules are holding at the levels recently established. As gaged by orders to Chicago district alloy bar mills, there is little or no change in the rate of automobile output. New sales in rail steel bars have brought a substantial volume of business to local mills; specifications, after lagging for several weeks, have again jumped a trifle ahead of shipments. Reinforcing bar requirements are large, but fair tonnages are also going to barn equipment makers and manufacturers of farm machinery. Prices are steady at 1.85c., Chicago Heights.

Mill prices per lb.: Soft steel bars, 2.00c. base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.85c., base, Chicago Heights mill.

Cast Iron Pipe.—Conditions are somewhat improved in the local cast iron pipe market. Price advances put in effect a week or 10 days ago are holding. In fact, in the last few days a number of small sales have been closed at prices that were well above $33, Birmingham. Large inquiries are not numerous, but there is a more lively interest shown over a wider territory. The National Cast Iron Pipe Co. has taken 600 tons of 6 to 12-in. centrifugal pipe for Dearborn, Mich. Among the larger inquiries are 2500 tons of 6 to 24-in. class C pipe for Roseville, Mich., and 1100 tons 6 to 16-in. pipe for St. Paul, Minn. Chicago will buy a round tonnage of 6 to 12-in. offsets and on May 22 will take bids on 225 tons of 16-in. class C pipe. Milwaukee, Detroit

and Durbin, W. Va., are in the market for tonnages that range from 100 to 200 tons each. Contractors in the Chicago area are busy, and the trade expects that fresh inquiry in good volume will soon be forthcoming from that source. Pipe foundries are reported moderately busy. Deliveries range from 30 to 45 days on most sizes.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $38.20 to $41.20; 4-in., $42.20 to $45.20; Class A and gas pipe, $4 extra.

Rails and Track Supplies.—Several miscellaneous lots of standard-section rails have added 3000 tons to makers' books. Reports in this district are mixed as to the extent of or the possibilities of a secondary buying movement. In some quarters doubt is expressed that the railroads as a general rule will even go as far as to specify fully against options taken last fall and winter. Scattered orders for track accessories total 3000 tons. Inquiry is dull. Chicago rail mills continue to produce at close to 90 per cent of capacity, and track supply departments are operating in like proportion. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Sheets.—New business is in small volume. Local mills are operating at about 60 per cent of capacity. Lack of sheet business does not indicate an unusual slackness in industries that use this commodity, as it is evident that stocks are large, though possibly not well rounded out, and that current orders are merely to hold consumers' stocks in a balanced condition. Competition by strip sheet manufacturers is keener in a few gages and widths.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 2.85c. to 2.95c.; No. 24 galvanized, 3.75c. to 3.85c.; No. 10 blue annealed, 2.20c. to 2.30c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Reinforcing Bars.—Of special interest in this market is the announcement that reinforcing bar warehouses in Chicago will handle rail steel reinforcing bars on a price schedule $6 a ton below that which has been set for the billet bar commodity. Prices for rail steel reinforcing bars for road work will remain at 1.85c., Chicago Heights, and 1.95c. on bridges. On building work the schedule will be 2c. for 18 tons or more, 2.30c. for 5 tons up to 18 tons and 2.70c. for less than 5 tons. Outstanding among new awards are 700 tons of rail steel bars for an apartment building in Chicago and 850 tons of new billet reinforcing bars for the approaches to the Crawford Avenue bridge. Illinois State roadwork awards remain active, the total placed this week being close to 300 tons. Fresh inquiry is a bit more sluggish than a week ago, but there still remains a sizable tonnage of projects against which dealers are bidding. Recent awards and new inquiries are given on page 1420.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.15c. to 2.40c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb.	$3.30
Common wire nails, base per keg	3.10
Cement coated nails, base per keg	3.10

Bolts, Nuts and Rivets.—For the second week specifications have shrunk from the average that was maintained during the early spring. Shipping orders are of fair size. Output is still at close to 60 per cent. Spot sales are in small volume, but are at the full prices.

Wire Products.—Reports from the jobbing trade to the East and in the Missouri River Valley are spotty, but to the South and in the Northwest new business and shipments are steady. A substantial volume of woven wire fencing is moving to dealers. Orders for staples are light because of the fact that steel posts are coming into more common usage. Little is known of the agricultural outlook for 1928 for the reason that in most parts of the country planting has been from 15 to 40 days late. Nails are moving very slowly in this market and there has been little or no business of a character that would test prices. Orders from the manufacturing trade are steady.

Coke.—Shipments of by-product foundry coke are steady and average close to the April rate. Prices are firm at $9, local ovens, and $9.50, delivered in the Chicago switching district.

Old Material.—The scrap market is marking time in all phases except shipments, which are still heavy. Mills are well supplied with heavy melting steel. A mill has taken a tonnage of bundled sheets at a reported delivered price of $11.75 a gross ton. A melter has purchased rolled steel wheels at $16 a gross ton, delivered. Railroad shipments are heavy. There is a tendency among some of the larger rail systems to issue more frequent and smaller lists. The Rock Island will sell 7000 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	13.50 to 14.00
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Forged, cast and rolled steel car-wheels	15.50 to 16.00
Railroad tires, charging box size	16.75 to 17.25
Railroad leaf springs, cut apart	16.75 to 17.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	17.00 to 17.50
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.00 to 14.50
Low phosphorus plate, 12 in. and under	14.25 to 14.75
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.25 to 9.75
Short shoveling turnings	9.25 to 9.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	14.00 to 14.50
Rerolling rails	14.50 to 15.00
Cupola Grades:	
Steel rails less than 3 ft	15.25 to 15.75
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	13.50 to 14.00
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.00 to 12.50
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	14.25 to 14.75
Iron arch bars and transoms	19.50 to 20.00
Iron car axles	23.00 to 23.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	5.75 to 6.25
Locomotive tires smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	12.75 to 13.25
No. 1 agricultural cast	12.50 to 13.00
Stove plate	11.25 to 11.75
Grate bars	11.25 to 11.75
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Philadelphia

Prices of Shapes and Black Sheets Lower —Pig Iron Exchanged for Ore

PHILADELPHIA, May 15.—Steel prices still show a lack of stability, but in eastern Pennsylvania, except on shapes, recessions have been less decided than in other districts. Transactions in shapes are reported at less than 2c. per lb., delivered Philadelphia, but 2.06c. to 2.13c. per lb., delivered, is the usual range of the market. Plate and bar prices in this district have apparently not gone below 2c., Coatesville, on plates and 1.85c., Pittsburgh, on bars.

While there is still a fair tonnage of fabricated steel business, much of the tonnage being placed is in sizable projects, usually secured by the leading fabricators. Prices on fabricated steel continue to recede, and the small fabricating shops complain that current business represents a loss, despite concessions in plain material prices.

Pig iron is quiet, except for a sizable transaction between a Phillipsburg, N. J., pipe maker and the leading eastern Pennsylvania independent, involving the exchange of about 10,000 tons of foundry iron for an equivalent value in iron ore from the Wharton, N. J., mines. Iron and steel scrap is inactive, and, with a slightly lower rate of mill operations a possibility, dealers look upon price recovery as remote.

Ferromanganese.—The new price of $105 per ton, seaboard, is being quoted by both domestic makers and importers on current small-lot shipments and for third quarter and second half contracts. Thus far, consumers have manifested no interest in contracting for the remainder of the year.

Pig Iron.—Buying is still limited to small lots, in most cases for early delivery, consumers not showing much interest in third quarter commitments. A York, Pa., manufacturer has closed on a small tonnage of No. 2 and No. 2X foundry iron for early delivery from an eastern Pennsylvania furnace. No concession from $20 per ton, base, is reported in the eastern Pennsylvania price. A Phillipsburg, N. J., pipe foundry has closed for about 10,000 tons of foundry iron with the leading eastern Pennsylvania independent producer on a basis of exchange of iron ore of equivalent value from the Wharton, N. J., mines. Pressure pipe producers are fairly well covered for the present, but soil pipe plants have only small stocks of iron and may appear as buyers before long. Low phosphorus is quiet, and, with a fair tonnage on its yard to supply customers for the next few months, Chateaugay furnace is expected to go out of blast about the end of this month or early in June. The recent reduction of 50c. a ton in the price of Birmingham foundry iron is expected to result in a corresponding recession in the Virginia iron price when either of the two Virginia cast iron pipe plants enter the market. Meanwhile, on current small-lot orders the price is unchanged.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.00 to 19.50
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	22.00 to 23.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—New business is still rather limited, being confined to small tonnages, on which 1.85c. per lb. and occasionally 1.90c. per lb., Pittsburgh, or 2.17c. to 2.22c., delivered Philadelphia, usually apply. Reinforcing bar projects are in most cases small, usually being tonnages to be used in conjunction with structural steel construction.

Shapes.—Prices continue irregular, with less than 2c. per lb., delivered Philadelphia, reported on desirable specifications, although the current market is quotable at 2.06c. to 2.13c. per lb., delivered, the lower price being on the basis of 2c. per lb., Pencoyd. Fabricated steel prices still show softness, and, even at the present slightly lower level of structural steel prices, fabricators claim that there is little or no profit to be taken from most projects. Only small tonnages are included in the construction reported in this district, except for 1900 tons in a bridge at Sunbury, Pa., and about 3000 tons in a Lake Champlain bridge, both of which have been closed.

Plates.—A moderate volume of small orders is being placed, and on much of this 2.05c., Coatesville, or 2.15c., delivered Philadelphia, is being obtained, with 2c., Coatesville, or 2.10c., Philadelphia, applying on larger lots. Not much interest is shown by consumers in third quarter buying, as second quarter contracts at the present rate of consumption may carry buyers well into July, if extensions are granted. There is some plate tonnage in recent bridge projects, such as the Lake Champlain bridge, which includes about 1000 tons of plates, and the Sunbury, Pa., bridge, which takes a smaller tonnage. Although price concessions have been made in other districts, the minimum quotation of eastern Pennsylvania producers is apparently still 2c., Coatesville.

Sheets.—Local producers of blue annealed sheets are still endeavoring to maintain 2.10c. per lb., Pittsburgh, on blue annealed sheets, and on much of the present business, which seldom exceeds a carload and is often less, this price seems to apply. On more desirable business, however, 2.05c. and 2c. per lb., Pittsburgh, or 2.32c. to 2.37c., delivered Philadelphia, are being done. Black sheets still show a downward tendency, with quotations at 2.70c. to 2.75c., Pittsburgh, or 3.02c. to 3.07c., Philadelphia, and occasional sales reported on a basis of 3.65c., Pittsburgh. Galvanized sheets range from 3.60c. to 3.70c., Pittsburgh. Despite the irregularity of prices, business continues fairly good, although confined to small tonnages.

Warehouse Business.—Quantity differentials, which have been effective on bars and bar-sized shapes, have now been extended by warehouses in this district to include cold-finished steel, hoops and bands. Base prices on cold-finished material continue unchanged at 3.35c. per lb. for rounds and hexagons and 3.85c. per lb. for squares and flats, but hoops have been reduced to 3.50c. per lb., base, and bands to 3.25c. per lb., base. There is a fair volume of business, comparing favorably with the average for April.

Imports.—In the week ended May 12, a total of 2000 tons of chrome ore arrived at this port from Portuguese Africa. Pig iron arrivals totaled 750 tons, of which 447 tons was Indian and 303 tons Dutch iron. There was also ¼ ton of ferrozirconium from the United Kingdom. Steel imports consisted of 55 tons of structural shapes, 27 tons of sheets and 1 ton of hoops and bands from Germany, 62 tons of hoops and

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.60c.
Plates, ⅛-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.50c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to ⅜-in., inclusive	3.25c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bundles, 4.25c. base; 1 to 9 bundles, 4.50c. base.
†For 50 bundles or more; 10 to 49 bundles, 5.10c. base; 1 to 9 bundles, 5.45c. base.

bands, 150 tons of steel bars and 299 tons of shapes from Belgium and 503 tons of bars and 65 tons of shapes from France.

Old Material.—Prices of some grades of scrap still show a downward tendency, and, in view of the possibility that the recent high rate of mill operations may not be maintained, an early recovery of prices is not looked for. One large eastern Pennsylvania consumer, which recently bought about 15,000 tons of No. 1 heavy melting steel for Steelton, Pa., at $13.50 per ton, delivered, has closed on about 5000 tons at the same price for delivery to Sparrows Point, Md. About 1000 tons of blast furnace scrap has been bought at $10.50 per ton, delivered Sparrows Point, and the consumer at Bethlehem is not expected to offer more than $10.50, Steelton, or $10, Bethlehem, on future purchases of blast furnace material. A Phoenixville, Pa., mill is taking machine shop turnings at $10.50 per ton and is offering $11 for yard steel and $11.50 for stove plate.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
Bundled sheets (for steel works)	10.50
Machine shop turnings (for steel works)	10.50 to 10.75
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mill)	10.50 to 11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	11.50 to 12.00
No. 1 low phos., heavy, 0.04 per cent and under	17.50 to 18.00
Couplers and knuckles	15.50 to 16.00
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.00 to 11.25
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Steel rails for rolling	14.75 to 15.25
Cast iron carwheels	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00

New York

Pig Iron Sales of 19,000 Tons—Eastern Steel Mills Operating Well

NEW YORK, May 15.—Sales of pig iron in this district, at 19,000 tons, were the largest in many weeks. A considerable portion of this tonnage was for third quarter delivery, and there is an increasing volume of inquiry for that period. Melters are taking advantage of barge or barge-and-rail shipment to a greater extent than in previous years. A New Jersey melter is reported to have bought Buffalo pig iron at delivered prices ranging from $19.25 to $19.50. Eastern Pennsylvania producers are finding it difficult to reach this section, and their quotations of $20, base furnace, are consequently largely nominal. Buffalo foundry iron continues to range from $16 to $16.50, base furnace. Eastern New York furnaces are meeting Buffalo competition. The Thatcher Co., Garwood, N. J., has placed 2000 tons of No. 2 plain for the current quarter. The Central Foundry Co., New York, has closed for 5000 tons for its Dundalk, Md., plant, of which 3000 tons is understood to have gone to a nearby furnace and 1000 tons each to eastern New York and New England producers. The A. P. Smith Mfg. Co., Bloomfield, N. J., has placed 900 tons of No. 2 plain and No. 2X for third quarter shipment. An inquiry in this district calls for 2000 tons of malleable. A New Jersey melter is still in the market for 1000 to 2000 tons of No. 1X.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Reinforcing Bars.—Business has been very quiet in the last week with no sizable jobs reported let. Reconstruction of a pier on the North River will require 200 tons. Prices have shown no further weakness.

Finished Steel.—While specifications and orders for steel products in the first half of May have fallen below the average of April bookings, shipments are holding up at a good rate. Eastern mills are running on the average about as well as in April, and in the case of the leading Eastern steel company operations this month are larger, being above 80 per cent. Weakening prices of sheets have somewhat curtailed the volume of ordering, but business in plates, shapes and bars is fairly active. Current bookings of fabricated structural steel are in reduced volume, so that present mill activity in shapes represents largely the projects that have been placed during recent months. Sheet prices are not materially different from those in effect a week ago, except that sales of black sheets at 2.70c., Pittsburgh, have become more common and there have

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars and small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.50c.
Bands	4.00c.
Blue annealed sheets (No. 10 gage)	3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
⅜ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
⅜-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.20c.
No. 18	4.35c.
No. 20	4.50c.
No. 22	4.55c.
No. 24	4.70c.
No. 26	4.95c.
No. 28*	5.20c.
No. 30	5.60c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

been further sales of galvanized sheets at 3.55c. However, on the latter grade 3.60c. is more representative of a majority of the transactions. Blue annealed sheets continue at 2c. to 2.10c., Pittsburgh. The leading producers of wire nails are maintaining quotations of $2.65 per keg, base Pittsburgh, but users are having little difficulty in getting nails from some of the smaller producers at $2.55. The American Bridge Co. is low bidder on 3000 tons for a Lake Champlain bridge. The Hay Foundry & Iron Works has been awarded 2000 tons for an apartment building in New York. A Syracuse, N. Y., office building will take 2500 tons.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.12½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Orders are small, but in the aggregate represent a fair total, which is expected to compare favorably with last month. There is moderate activity in structural material, but sheet business is small and concessions are not unusual. Black sheets are quoted at 4c. per lb., base, and galvanized at 4.70c., base, but in both cases concessions range from 10c. to 20c. per 100 lb. There is also slight softness in blue annealed sheets, but concessions on this grade seldom exceed 5c. per 100 lb.

Cast Iron Pipe.—Prices continue fairly firm, with Northern makers seldom quoting below $38.60 per net ton, New York, which is sufficiently low to prevent Southern foundries from competing, as the Birmingham base is $31 per ton for sizable lots and $33 per ton for small orders, to which must be added a freight rate of $9.25 per ton to New York. Although $33, base, is generally asked by Southern pipe makers, very little business has been closed on this basis. There is some buying in New York for shipment to projects in other districts and a moderate volume of inquiry from private utility companies. Municipal business continues light, only a few small purchases being reported.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.60 to $38.60; 4-in. and 5-in., $42.60 to $43.60; 3-in., $52.60 to $53.60; Class A and gas pipe, $4 to $5 extra.

Old Material—Prices show no strength and the market continues quiet. While brokers are apparently unwilling to contract for a substantial tonnage of stove plate at $11.50 per ton, delivered Phoenixville, Pa., carload lots are being shipped on this basis, also yard steel purchased at $10.50 and machine shop turnings at $10 and $10.25 per ton, delivered Phoenixville. Blast furnace scrap is being purchased at $10 per ton, delivered to Bethlehem, Pa., against $10.50 orders, but the consumer there is apparently now unwilling to pay more than $10 per ton. Chemical borings are being shipped to a consumer at Bound Brook, N. J., at $13.25 per ton, delivered. Stove plate to local foundries continues unchanged at $10.50 to $11 a ton, delivered.

Dealers' buying prices per gross ton f.o.b. New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.25
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	7.25 to 7.50
Locomotive grate bars	7.50 to 8.00
Machine shop turnings	6.50 to 7.25
Short shoveling turnings	6.50 to 7.25
Cast borings (blast furnace or steel works)	6.25 to 7.25
Mixed borings and turnings	6.50 to 7.25
Steel car axles	15.00 to 15.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. dia., not under 2 ft. long)	8.00 to 8.50
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought, long	8.50 to 9.00
Rails for rolling	10.00 to 10.50
Cast iron carwheels	11.00 to 11.50
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00
Cast borings (chemical)	10.75 to 11.25

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.50 to $14.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.50 to 12.00
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Coke.—There is very little activity in prompt shipment coke and consumers are not yet interested in third quarter and last half contracts. Of the special brands of foundry coke, one, which has been selling at $5.10 per net ton, ovens, has been reduced 25c. per ton to $4.85. Other brands continue at $5 and $5.10 per ton. Delivered prices on special brands of foundry coke are: To northern New Jersey, Jersey City and Newark, $8.56 to $8.81 per net ton; to New York and Brooklyn, $9.44 to $9.59 per net ton. By-product foundry coke ranges from $9 to $9.40 per net ton, Newark or Jersey City, N. J., and from $10.06 to $10.29 per ton, New York or Brooklyn.

Cleveland

Demand for Plates, Shapes and Bars Falls Off—Hot-Rolled Strips Weak

CLEVELAND, May 15.—The steel market showed evidence of slowing down during the past week. The demand for steel bars, plates and structural material fell off. There was very little new business and specifications against contracts were limited to small lots. Plate orders are especially light.

Shipments generally are in excess of orders, and unless the demand takes a turn for the better some of the mills will probably slow down operations before the end of the month. The automotive industry continues the bright spot in an otherwise dull market. Specifications from this industry are holding up to the recent volume, and the motor car builders, with two or three exceptions, have made no curtailment in operations. Some of the automobile companies have placed steel orders for July production. Present indications are that a seasonal slowing down in that industry will not occur before June 15 or later. Most of the mills that serve the automobile industry with alloy steel bars, sheets and strip steel have enough tonnage on their books to maintain present operations for two weeks or longer.

Inquiry in the structural field, while not good, shows slight improvement. Industries outside of the automotive field are maintaining recent operations.

Little change in the price situation developed during the week further than a more pronounced weakness in hot-rolled strip steel. Sheets continue weak, but are not lower than they have been. Steel bars, plates and structural material are firm at 1.85c., Pittsburgh. Local mills are maintaining 1.85c., Cleveland, on steel bars.

Iron Ore.—The market is almost devoid of inquiry. Shippers now have most of their boats in commission and the water movement during the latter half of the month will be fair. On May 1 there was 5,182,388 tons of ore on Lake Erie docks, as compared with 4,703,294 tons on the same date a year ago. Dock shipments are light; they were only 397,246 tons during April, compared with 1,150,507 tons during the same month last year.

Pig Iron.—Sales continue in moderate volume, business being about evenly divided between orders for early shipment and third quarter contracts. Cleveland interests sold 14,500 tons of foundry and malleable iron during the week. The American Rolling Mill Co. has an inquiry out for 25,000 tons of basic iron for its Butler, Pa., plant for the third quarter. This promises a test of the present $16.50 price on basic iron. Not much interest is being shown as yet in foundry and malleable iron for the third quarter. Foundries in the automotive industry are awaiting the development of the business outlook for that industry for the latter part of the year. As yet there has been no slowing down in the demand for pig iron from motor car build-

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.85
No. 9 galvanized wire, per 100 lb	3.30
Common wire nails, base per keg	2.85

*Net base, including boxing and cutting to length.

ers and allied foundries, so that May shipments are expected to about equal those of April. Prices show no change, ranging from $16.50 to $17, Lake furnace, for foundry and malleable iron. For Cleveland and Michigan delivery the price is fairly steady at $18.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fry., sil. 1.75 to 2.25	21.50
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	16.50
Standard low phos., Valley furnace	26.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Coke.—New demand for foundry coke is light. Prices are steady at $7.75, Painesville, for Ohio by-product coke and $3.75 to $5.10 for Connellsville grades. Small lots of Ohio by-product coke for domestic use are moving at $4.50, Valley ovens, for egg size.

Bolts, Nuts and Rivets.—The demand for bolts and nuts from the automotive industry has started to slow down. Consequently the volume of business is less than last month. Rivets are not very active. Prices are firm.

Semi-Finished Steel.—Some of the sheet mills are not running quite as well as recently, and this is reflected in a slight falling off in the demand for sheet bars. However, the leading local producer is still operating its plant at 100 per cent of capacity. A few buyers have indicated that they are willing to close third quarter contracts for sheet bars at the present price, $33, Cleveland, but mills are not quoting for that delivery and there is some talk of trying to get $1 a ton advance, or $34, for sheet bars and also for slabs and billets.

Sheets.—The demand in this territory has declined somewhat and is light both in new business and in specifications against contracts. While specifications from the automotive industry continue heavy, some of the mills need orders to maintain present operations. The market continues weak, but mills are not inclined to shade the minimum quotations that have appeared in the past two weeks. Black sheets are selling as low as 2.70c. to 2.75c., Valley mill. On galvanized sheets 3.55c., Valley mill, is a rather common quotation. Blue annealed sheets have sold at 2c., Valley, although 2.05c. is the usual minimum quotation by jobbing sheet mills and most producers are holding to 2c., Pittsburgh. While some business has been taken at 1.90c., Pittsburgh, this price, it is claimed, has been for continuous mill products. Auto body sheets are firm at 4c.

Strip Steel.—Mills continue to get a good volume of business from the Detroit territory, but the local market is dull. Prices on hot-rolled strip, particularly in wide material, are weak. Strip 12 in. and wider is selling as low as 1.75c., Pittsburgh, and some of the mills are going to about the same price on 6 to 12-in. material, or $1 a ton lower than the recent minimum prices. Strip 3 in. to 6 in. wide is around 1.95c., and on material narrower than 3 in. there is a range of from 2.10c. to 2.20c. Cold-rolled strip is commonly quoted at 2.75c., Cleveland for 3 tons and over, although some small lots are still bringing 2.90c.

Nails and Wire.—Local jobbers have reduced nail prices 10c. per keg for stock shipment and to $2.65 per keg, Cleveland, for mill shipment, or the same price that mills are quoting to most buyers in this territory. Jobbers have also reduced annealed and galvanized wire $2 per ton. They have good stocks bought before the last price advance, and these are moving rather slowly. Nail prices continue irregular in sections served by Ohio River mills.

Reinforcing Bars.—Little business or inquiry developed during the week. The only round lot pending is 800 tons for the Cleveland Union Terminals Co., which probably will go to a local mill. Rail steel bars are unchanged at 1.75c., mill.

Warehouse Business.—The demand for steel bars, plates and structural material is moderate, holding up to about the April volume. Aside from some irregularity in steel bars in outlying sections, prices are well maintained. Sheets are moving rather slowly.

Old Material.—The market is weak on heavy melting steel scrap, which has declined 25c. a ton. At present $13.25 is the maximum for No. 1 grade and more than is wanted is available at that price. A Cleveland consumer who is restricting shipments has made further curtailments, which is a contributing factor to the weakness on steel-making grades. Another Cleveland consumer, who seldom comes in the open market and whose specifications are exacting, purchased a small tonnage of heavy melting steel at $14, and dealers are paying $13.50 to $13.60 for scrap to meet this customer's requirements. In the Valley district dealers are paying $14.50 for heavy melting steel. Small lots of blast furnace scrap are moving at the quoted prices.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.00 to $13.25
No. 2 heavy melting steel	12.50 to 12.75
Compressed sheet steel	12.50 to 12.75
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	11.75 to 12.25
Machine shop turnings	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 13.75
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	9.25 to 9.50
Mixed borings and short turnings	9.25 to 9.50
No. 2 busheling	9.25 to 9.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Detroit Scrap Market Quiet and Prices Are Unchanged

DETROIT, May 15.—There have been no sales of large tonnages of scrap during the past week. Prices have shown no change.

Dealers' buying prices per gross ton f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.00 to $11.50
Borings and short turnings	7.25 to 7.75
Long turnings	6.75 to 7.25
No. 1 machinery cast	14.00 to 15.00
Automobile cast	19.50 to 21.00
Hydraulic compressed sheets	9.75 to 10.25
Stove plate	11.00 to 12.00
No. 1 busheling	8.50 to 9.00
Sheet clippings	6.00 to 7.00
Flashings	9.25 to 9.75

Weirton Steel Co. Starts Another Expansion Program

Work began this week on additions and improvements to the plant of the Weirton Steel Co., Weirton, W. Va., involving an expenditure of $1,350,000. The program calls for a new 250-ton open-hearth furnace with producers; additions to the pit furnaces; a stripper building with one additional row of soaking pits and the necessary equipment; an addition to the slab yard; also changes in the 10-in. and 16-in. mills, adding materially to the productive capacity of these units.

The additional finishing capacity has made necessary the addition to the steel plant, which will bring the annual open-hearth ingot capacity to 1,200,000 gross tons in 1929. It is now 1,050,000 tons, although the March production of 103,576 tons was at an annual rate of 1,193,000 tons. In 1925 the company had a capacity of 570,000 tons annually.

John C. Williams, vice-president and general manager, and C. H. Hunt, chief engineer, have been responsible for all extensions of productive facilities the company has made, and have been the guiding hands in its transition from merely a producer of tin plate to a fully integrated steel company, having its own ore and coal mines, blast furnaces, coke ovens and steel works.

San Francisco

Improvement in Demand for Shapes, Plates and Cast Iron Pipe

SAN FRANCISCO, May 12 (*By Air Mail*).—Demand for structural shapes, plates and cast iron pipe has increased during the past week or 10 days. Awards include 270 tons of bars for the Kittitas project at Ellensburg, Wash., placed with the Pacific Coast Steel Co., 360 tons of shapes for the Twentieth Century Market, Oakland, taken by Judson-Pacific Co., and 425 tons for the new A. M. Castle Co. steel warehouse in Los Angeles, obtained by the Baker Iron Works.

Pig Iron.—Importations in February were 36,596 tons at the four Pacific ports. San Francisco interests took 36,000 tons of iron ore and concentrates, all from Canada. Pig iron quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—New business placed this week, with one exception, was confined to lots ranging from 30 to 50 tons. Bids are being taken on 200 tons for the Stimson Building at Seattle, and bids have been called for, to be opened on June 4, for 450 tons for a power house and dam at Eugene, Ore. Imports of merchant and reinforcing bars in February totaled 4032 tons, compared with 1612 tons for February, 1927, and 4322 tons for January, this year. Out-of-stock prices in the bay district on reinforcing steel bars remain weak, and 2c. is being quoted.

Plates.—Several new inquiries for plates have come up for figures. The Chicago Bridge & Iron Works took 150 tons for two tanks for the Zellerbach Paper Co. at Port Townsend, Wash., and 100 tons for two tanks for the Grays Harbor Pulp & Paper Co. at Grays Harbor, Wash. Bids are to be opened next week on 1600 tons for a pipe line at Tacoma, Wash. The Birchfield Boiler Co. was low bidder on 115 tons for a pipe line for the same city. No action has yet been taken on the 700-ton inquiry for a car float for the Santa Fe. The Western Pacific is also asking for bids on a 700-ton car float. The Wildcat and Sequoia aqueduct projects, calling for 8000 tons of plates, will most likely be awarded next week. The district engineers, it is reported, are in favor of using steel-lined concrete pipe. Prices on plates are firm at 2.30c., c.i.f. Coast ports.

Shapes.—During February 2996 tons of foreign shapes were imported on the Coast as compared with 1044 tons for February, 1927. Only four awards of over 100 tons were noted this week. The Wallace Bridge & Structural Steel Co. booked 100 tons for the Bon Marche store, Seattle. C. & F. W. Steffgen, San Diego, got the general contract for 260 tons for a bridge on the Benson highway at Phoenix, Ariz. Considerable new and pending work is before the trade for figures, about 15,000 tons being involved. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Demand for cast iron pipe is improving, although only one award of over 100 tons was reported this week. Camas, Wash., placed 152 tons of 2 to 8-in. class B pipe with C. A. Knapp of the same city. Los Angeles rejected all bids on 234 tons of 24-in. class B pipe. Bids will be opened May 23 for 1560 tons of 4 to 12-in. class B for street improvements at Oceanside, Cal. Los Angeles opened bids on 1665 tons of 6-in. class B pipe and on 1800 tons of 30 and 36-in. class B pipe for the Venice outfall sewer, the United States Cast Iron Pipe & Foundry Co. being low on the latter project. Long Beach opened bids on 417 tons of 6 and 8-in. class B and C pipe. Puyallup, Wash., will open bids on July 10 for 149 tons of 14-in. class B or centrifugal pipe. San Diego, Cal., will open bids on June 4 for 113 tons of 18-in. class B for a dredging project. Importations during February aggregated 1843 tons, compared with 4583 tons for the same month a year ago.

Standard Pipe.—Importations of tubular products during February totaled 1343 tons, compared with 1503 tons for February, 1927. The only inquiry of importance is for 193 tons of ½ to 4-in. standard pipe for Los Angeles.

Coke.—Demand for coke reflects the quiet condition prevailing in the pig iron market; sales and inquiries appear to be confined entirely to small lots. Prices are unchanged.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

St. Louis

Steel Specifications Top Those of April —Weakness in Some Scrap Items

ST. LOUIS, May 15.—The tonnage of pig iron sold during the last week was less than that of the previous week. The sales of the St. Louis Gas & Coke Corporation totaled 3500 tons, including 1000 tons of malleable to an Illinois melter, 500 tons of malleable to a local plant and 800 tons of foundry iron to an implement manufacturer for third quarter shipment; the remainder was in lots up to 150 tons for prompt shipment. The leading Southern interest sold 600 tons for prompt shipment. The only definite inquiry pending is for 250 tons of foundry, but a number of other transactions are pending. The fact that there is considerable iron yet to be bought for third quarter shipment lends strength to the market. Prices are firm and unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	$19.92 to 20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—Buying of domestic grades of coke is good, considering the season. Consumers of foundry coke continue to buy of local by-product ovens as the fuel is required.

Finished Iron and Steel.—The Granite City Steel Co. reports that specifications so far this month have been in larger volume than the corresponding period in April. The company is well fortified as regards backlog tonnage in blue annealed and black sheets, tin plate and tank plate. Galvanized sheets continue slow, and prices are lower than they were a week ago, but the indications are that the demand will pick up within the next two or three weeks, when it is believed the agricultural districts will be buying. Fabricators of structural steel continue to complain of poor business.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	70
Less than 100 lb	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, squares, blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Track Supplies.—The Missouri Pacific has purchased 1000 kegs of track spikes for its Western lines from the Colorado Fuel & Iron Co. That road is now in the market for 1000 kegs of track bolts.

Old Material.—The market for old material is weaker, and prices for heavy melting steel, heavy shoveling steel and No. 2 railroad wrought are 25c. lower. A leading East Side mill was in the market for specialties, but the prices offered were lower than dealers had expected, and the tonnages purchased were small. Some dealers believe that most of the consumers will be in the market again within the next 10 days or two weeks. Railroad lists are unusually heavy, including the following: Baltimore & Ohio, 17,880 tons; Louisville & Nashville, 16,760 tons; Chesapeake & Ohio, 10,011 tons; Wabash, 2880 tons; Southern Pacific, 2766 tons; International Great Northern, 895 tons; Texas & Pacific, 820 tons; Southern, 782 tons; Ann Arbor, 282 tons; Kansas City Southern, 239 tons; Great Northern, 90 carloads; Cotton Belt, 25 carloads; Nickel Plate, 21 carloads; St. Louis-San Francisco, 16 carloads; Chicago & Eastern Illinois, 13 carloads; Chicago, Milwaukee, St. Paul & Pacific, 11 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

Heavy melting steel	$11.25 to $11.75
No. 1 locomotive tires	12.00 to 12.50
Heavy shoveling steel	11.25 to 11.75
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	12.75 to 13.25
Railroad springs	13.75 to 14.25
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.50 to 10.00
Cast iron borings	9.00 to 9.25
Iron rails	13.00 to 13.50
Rails for rolling	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Steel car axles	17.50 to 18.00
Iron car axles	23.50 to 24.00
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	13.00 to 13.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Birmingham

Southern Pipe Foundries Receive Large Orders—Sheets Reduced $1

BIRMINGHAM, May 15.—Conditions in the pig iron market are practically unchanged. Sales for the week barely reached the average of the two preceding weeks. Buying is in small lots for early delivery and furnace interests are unable to definitely determine the strength of the market. Stove plants and machine shops are the chief buyers at present. Increased business with pressure pipe makers is expected to increase the demand from that field shortly. Iron under contract is moving out at a fair rate. The Woodward Iron Co. blew in furnace No. 1 on foundry May 12. This was blown out on March 31 for relining. No other changes have been made. Eighteen furnaces are now in blast. Of this number 11 are on foundry, five on basic, one on recarburizing iron and one on ferromanganese.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$15.50 to $16.00
No. 1 foundry, 2.25 to 2.75 sil.	16.00 to 16.50
Basic	15.00

Finished Steel.—A reduction of $1 a ton has been made on black, galvanized and blue annealed sheets. May bookings in principal lines compare favorably with the corresponding period for April and little decrease in mill operations is in prospect for the next few weeks. Structural steel fabricators and bar manufacturers booked very little business during the past week. Local demand is the lowest for some time. Open-hearth operations have not changed during the past three weeks. The Tennessee company is operating seven at Ensley and four at Fairfield. The Gulf States Steel Co. is working four at Alabama City.

Cast Iron Pipe.—New business with the pressure pipe manufacturers showed a good increase during the past week. Local plants shared in the recent contracts placed by Detroit; the United States Cast Iron Pipe Co. took 5750 tons, the American Cast Iron Pipe Co. 1000 tons, and the National Cast Iron Pipe Co., 750 tons. The American Cast Iron Pipe Co. was awarded contracts on small municipal jobs at Greer, S. C., and Montgomery, Ala. The United States Cast Iron Pipe Co. received an order for about 8000 tons for Long Beach, Cal. Contracts are still pending on tonnages at Knoxville, Tenn., and Summerville, S. C. Inquiries have been received on additional tonnage for the district around Detroit. Shipments are keeping close to production. Quotations continue to be made at $31 to $33 on 6-in. and larger. The soil pipe market shows little or no improvement.

Coke.—The between-quarters inertia is noticeable in the coke market, where sales show a decline. Shipments have dropped below the average for the past several weeks. Quotations are unchanged from a $5 base.

Old Material.—The market is still weak and prices on some grades have been lowered. Heavy melting steel is being quoted at $9 to $9.50 instead of $9.50 to $10, and short shoveling turnings are being offered at $7.50 to $8. No. 1 cast has dropped 25c. Other prices remain the same.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.00 to $9.50
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	7.50 to 8.00
Cast iron borings	8.00
Stove plate	13.50
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	14.25
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Canada

Pig Iron Producers Not Yet Encouraging Third Quarter Buying

TORONTO, ONT., May 15.—Forward buying of pig iron is light at present as neither producers nor consumers are interested in negotiating third quarter business. Some existing contracts call for deliveries as far ahead as the middle of the third quarter, but generally speaking local blast furnace representatives have not opened their books for third quarter business and are not encouraging it. Spot sales are holding up well. Several inquiries appeared during the week, each of 200 to 600 tons. Melters now inquiring are specifying water delivery on which freight charges are considerably less than on rail shipments. Canadian pig iron producers continue to complain of the strong competition in the local markets from United States and British pig iron makers. This competition has not only deprived Canadian furnace operators of a part of their market for foundry and malleable grades, but at the same time has had a tendency to bring prices here to a level at which some furnaces cannot afford to sell, and as a consequence some are refusing orders outright or are quoting $1 per ton above the going prices. The increased consumption of foundry and malleable iron in Canada, which amounts to from 10 to 20 per cent over that of a year ago, is mostly supplied by imported iron; thus Canadian producers have not materially benefited by the betterment in general conditions here.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.10 to $23.60
No. 2 foundry, sil. 1.75 to 2.25	23.10 to 23.60
Malleable	23.10 to 23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	24.50 to 25.00
No. 2 foundry, sil. 1.75 to 2.25	24.50 to 25.00
Malleable	24.50 to 25.00
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—A spotty but somewhat improved demand features the Canadian old material markets.

Several large sales were made during the week, and inquiries for forward delivery were more prominent in both Toronto and Montreal markets. Current demand calls chiefly for heavy melting steel, machine shop turnings and machinery cast in Toronto, while in Montreal wrought iron and steel axles are also in demand. Prices are unchanged, but a softening tendency is setting in.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
Per Net Ton		
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

Cincinnati

Pig Iron Sales of 9,000 Tons—Some Falling Off in Steel Business

CINCINNATI, May 15.—Pig iron sales in the past week have amounted to about 9000 tons, of which 6000 tons was bought by a malleable foundry at Muncie, Ind., from a Lake Erie furnace. The only other sizable transaction consisted of 500 tons of Jackson County silvery iron for delivery to a Michigan consumer. Aside from 400 tons of foundry iron for the Lunkenheimer Co., Cincinnati, inquiries have been for small lots ranging from 100 tons down to single carloads. The price situation is virtually unchanged. Southern iron is reported to be available at $15.50, base Birmingham, although some producers declare that they are refusing to book orders under $16. Southern Ohio foundry remains nominally at $19, base Ironton, while Jackson County silvery is selling at $25, base furnace, for 8 per cent. Northern Ohio makers are said to be quoting a minimum of $16.50, base furnace, for delivery into this district.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy. sil. 1.75 to 2.25	19.19 to 19.69
Alabama fdy., sil. 2.25 to 2.75	19.69 to 20.19
Tennessee fdy. sil. 1.75 to 2.25	19.19 to 19.69
Southern Ohio silvery 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—There has been a further recession in specifications and orders for heavy steel products and for sheets. Fabricators are disappointed because the amount of work now pending is less than normal for this time of the year and several major projects for which plans have been made will not come up for bids until fall. Meanwhile, most shops are counting upon a moderate number of small orders to keep production up to a fair level. Bars, structural shapes and plates are firm at 1.85c., base Pittsburgh, and there is an increasing tendency on the part of mills to accept that figure for small miscellaneous lots. In the sheet market, bookings have slumped in the past two weeks to a point considerably short of production and shipments. The brightest spot is the activity in electrical sheets, many consumers being busy on electrical apparatus for the radio industry. Releases of tonnages for automobile makers still hold up well. There has been no change of consequence in prices, which are stationary at the low level of the year, black sheets bringing 2.75c. to 2.85c., base Pittsburgh, blue annealed 2c. to 2.10c., galvanized, 3.65c. to 3.75c. and automobile body sheets, 4c. Users of wire goods are taking only a fair volume of material and prices are depressed. Common wire nails are selling at $2.50 per keg, base Ironton, plus a 14c. barge rate to this city, while plain wire is quoted at $2.40 per 100 lb., base Ironton.

Warehouse Business.—Shipments from warehouses of local jobbers are closely paralleling those in the corresponding period of 1927. From the standpoint of tonnage, bars and structural steel are the leaders. Quotations are steady and unchanged.

Coke.—The purchase of 12,000 tons of by-product furnace coke by the Kokomo Steel & Wire Co., Kokomo, Ind., from a central Indiana company was the feature of the week. By-product foundry coke specifications have fallen behind the volume maintained during April. Shipments of beehive foundry coke into this district have been rather sluggish.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.02; Wise County coke, $7.09 to $7.59; New River coke, $9.09 to $9.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—While there have been no changes in prices, quotations in some items are showing a tendency toward weakness. Offerings of railroads in the past week are reported to have brought less than in April. Shipments to district steel plants have been of fair volume.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.00 to $11.50
Scrap rails for melting	11.25 to 11.75
Loose sheet clippings	8.25 to 8.75
Bundled sheets	9.25 to 9.75
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.00 to 7.50
Rails for rolling	12.50 to 13.00
No. 1 locomotive tires	12.75 to 13.25
No. 1 railroad wrought	10.00 to 10.50
Short rails	15.75 to 16.25
Cast iron carwheels	12.25 to 12.75
No. 1 machinery cast	15.25 to 15.75
No. 1 railroad cast	12.75 to 13.25
Burnt cast	7.50 to 8.00
Stove plate	8.25 to 8.75
Brake shoes	9.50 to 10.25
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.00 to 11.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforcing bars	3.15c.
Rail steel reinforcing bars	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in	19.00
4-in.	39.00

Buffalo

Lackawanna Plant Increases Operations —Pig Iron Market Quiet

BUFFALO, May 15.—The pig iron market is very quiet. Prices remain at about the levels of recent weeks. Buffalo iron can be bought in New England at prices ranging from $16 to $16.50, Buffalo, but $17 for No. 2 plain and $17.50 for malleable prevail in this district. A part of the Thatcher Co.'s inquiry for 2000

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire base per 100 lb	3.90

tons of No. 2X and No. 2 plain has been placed. One maker reports orders for about 2000 tons of foundry and malleable. There is some third quarter inquiry from New Jersey and Pennsylvania. A Maryland inquiry for 1000 tons of foundry is reported to be still open.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2 foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	$16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Bethlehem's Lackawanna plant has increased open-hearth operation to 22 furnaces out of 24. Bar, shape and plate prices are firm, and sheet prices show a firmer tendency. A 500-ton inquiry for reinforcing bars is pending. Reinforcing bar prices are not strong, showing a range of 2.40c. to 2.75c. for truck delivery. The nut and bolt demand from the automobile industry is tapering slightly, but railroad buying is satisfactory. An improvement is noticed in the market for semi-finished nuts, on which the market has been not quite so firm as on bolts. Makers report heavy commitments for road mesh.

Old Material.—The market is unusually quiet and is rendered more so by the continued suspension of shipments by one of the large consumers. There have been no sales of size. Prices in general have softened. One mill has taken in about 1500 tons of heavy melting steel by barge from an Eastern point. Dealers' stocks are low. Pennsylvania, Erie, New York Central and Michigan Central railroad lists closed last week. The Pennsylvania heavy melting steel brought $15.50, Pittsburgh district.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.50 to $14.75
No. 2 heavy melting steel	12.50 to 13.00
Scrap rails	13.50 to 14.00
Hydraulic compressed sheets	12.50 to 13.00
Hand bundled sheets	8.50 to 9.00
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.50 to 12.75
Machine shop turnings	8.25 to 8.75
Acid Open-Hearth Grades	
Railroad knuckles and couplers	15.50
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.00 to 15.50
Low phosphorus billet and bloom ends	16.50 to 17.00
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	10.75 to 11.25
Blast Furnace Grades	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	9.50 to 10.00
Cast iron borings	9.25 to 9.75
No. 2 busheling	9.00 to 9.25
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.50 to 13.75
Locomotive grate bars	12.00 to 12.50
Steel rails 3 ft. and under	16.50 to 17.00
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.00
Agricultural	15.00
Industrial	15.00

A. M. Castle Co. to Build Plant at Los Angeles

Contract for the construction of a new steel plant at Los Angeles for the A. M. Castle Co., Chicago, has been awarded to the Baker Iron Works, Los Angeles. The new structure will cover about five acres and will be devoted to the warehousing and distribution of iron and steel products. The building will be in four bays, each 70 x 500 ft., which will be constructed entirely of steel and will be served by traveling cranes. Additional equipment will include motor-driven cutting machines for plates, sheets, bars and structural shapes. When completed the plant will represent an outlay of approximately $350,000.

The Castle company also has branches at Seattle and San Francisco. Officials of the company state that in addition to caring for the needs of southern California, the markets of Mexico and South America will be served from the Los Angeles plant.

Youngstown

Steel Demands of Motor Car Builders Chief Prop of Mill Activities

YOUNGSTOWN, May 15.—Steel manufacturers in this district still make a favorable report about business, crediting the good showing largely to the fact that motor car builders are taking steel freely. There has rarely been a better movement of automobile body sheets than now. Strips also are moving well from plants in this district. The other products of the district mills, however, are not doing particularly well, and doubt is expressed that the present rate of ingot production, which ranges from 75 to 80 per cent of capacity, could be maintained if there is any letdown by the automotive industry.

Pipe, which ranks with sheets in importance in point of output in this district again is quiet. The withdrawal of the extra 5 per cent discount on standard-weight pipe, effective as of April 2, stimulated buying by jobbers, who were given the right to order a month's supply at the old prices, but such business now is water over the dam, and new mill orders are somewhat limited while the jobbers work off their extra purchases. Oil country pipe demands are small, as they have been since late last year, and there are few so optimistic about the situation as to predict that the oil situation will have been corrected in time to have a helpful effect upon the demand for drill and drive pipe and casing during the remainder of this year. There are several gas pipe line projects under consideration taking huge tonnages of large outside diameter pipe, but they do not appear to be moving very rapidly toward the mills.

Demand for the common finishes of sheets has been adversely affected by the weakness of prices, and there is not only a lighter operation of sheet mills than that of a few weeks ago, but also a lighter demand for sheet bars from the non-integrated manufacturers. The larger sheet producers here are making an effort to maintain black sheets at 2.75c., base Pittsburgh, galvanized at 3.65c., base Pittsburgh, and blue annealed at 2c., base Pittsburgh, but find that such prices are not easily obtainable in markets to the north and west. Competition makes necessary a price of 2.80c., mill, in Cleveland, on black sheets, which works back to 2.70c., base, at Pittsburgh, and similarly on blue annealed sheets it is necessary to make a Pittsburgh base equivalent of 1.90c. to get orders. Some makers are meeting rather than making these prices. Usually, a mill base on sheets is quoted only to large users within the confines of the Youngstown district.

The experience of the one maker of wire products in this territory is that the larger producers generally are holding firmly to $2.65, base, per keg, Pittsburgh or Cleveland, on bright nails and that there is a fair amount of specifying on second quarter contracts carrying that price. Bars are only fairly active, as makers of bolts and nuts are not as busy now as they were a short time ago and producers of cold-finished bars, in response to smaller orders for their product, are specifying less freely for hot-rolled bars. While occasional sales are being made at 1.90c., base Pittsburgh, 1.85c. is the ruling price and is being quoted on what would have been regarded as a small order recently when the buying was better. Tin plate plants are running practically full.

It is reported that basic iron recently has been sold at less than $16.50, Valley furnace, and while details are lacking, there is a disposition to credit the statement, since it is generally realized that the market for merchant Valley basic iron has been reduced to the territory adjacent to the Valley furnaces, in which there is only a limited demand. To get into the Pittsburgh district with that grade, producers would have to sell at $16 or less, furnace, to meet competition. The recent sale at $17, delivered Alliance, suggests a similar condition in that direction.

Most recent sales of heavy melting steel scrap in this district were at $15.50 for No. 1 grade, while $15 was paid for hydraulic compressed sheet scrap.

Boston

More Scrap Being Loaded for Danzig at an Advance of 50c. a Ton

BOSTON, May 15.—Pig iron sales have dropped sharply. The Mystic Iron Works booked orders for 3500 tons, divided between No. 2X and No. 1X, most of it for New England delivery, while the combined sales of other stacks did not quite reach that figure. Prospective business is confined to a few sizable tentative inquiries, aggregating several thousand tons, but foundries give no indication when they may buy. Contract iron is being taken on schedule, and stock piles in foundry yards have shrunk materially in the past month. Consequently, it is practically certain that third quarter buying will be more active shortly and of larger proportions than previously anticipated by sellers. At least one Buffalo furnace continues to accept business at $16 a ton, base stack, and recently has waived the 50c. differential on No. 2X. In addition, new rail-and-water freight rates from Buffalo, Troy and Port Henry, N. Y., give the seller quite a latitude in figuring on business. For the next four months, at least, the all-rail rate of $4.91 from Buffalo to New England will apply in only a few unimportant cases. Buyers will be able to secure a much lower rate in most instances.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$20.91 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Coke.—New England makers of by-product foundry coke see some improvement in contract specifications, and are reasonably certain that in June there will be a decided betterment, for by that time reserve stocks of foundries should be depleted. Competition from coke made outside of New England is still keen. While the tonnage brought into New England is not important, it has an important influence on prices.

Shapes and Plates.—The Boston & Maine Railroad will enter in the market this week for 15 bridges. How much steel is called for is not yet known. It is reported that the company will ask for bids next week on additional bridges. This week it will close on three, calling for 1900 tons of steel. Fabricators are securing a good number of small orders at good prices. Contract standard shapes are being billed out by mills at 1.80c. per lb., base Pittsburgh. Producers are soliciting new business at 1.85c. per lb. for round tonnages, and at 1.90c. for small lots, but fabricators maintain 1.80c. can still be done. Current business in plates is in small lots, but the weekly movement foots up well. Plates are steady at 1.85c. per lb., base Pittsburgh.

Cold-Rolled Strip.—New business is coming in slowly, and current orders are for consumers' immediate requirements only. Prices hold steady at 3c. to 3.15c. per lb., base Pittsburgh, on 1 to 3-ton lots. The American Steel & Wire Co. quotes 3.15c. to 3.30c. per lb., base Worcester, Mass.

Cast Iron Pipe.—Prices on small sizes of cast iron pipe have advanced about $2 a ton during the past fortnight. Four-inch pipe is now selling at $46.10 to $47.10 a ton, delivered common Boston freight rate points, and 6-in. at $41.10 to $42.10. Foundries are fairly well booked on these sizes. Concessions are still being made on 16-in. and larger pipe, however. The usual $5 differential is asked on Class A and gas pipe. One of the largest New England gas companies has closed several thousand tons of 24-in. pipe, and it is reported the Warren Foundry & Pipe Co. secured the business. That foundry was awarded 400 tons of 16-in. pipe by Haverhill, Mass. The Great Barrington, Mass., fire district has bought 200 tons of 6-in. and 8-in. pipe from the Donaldson Iron Co. Attleboro, Mass., closed bids May 14 on 100 tons 6-in. pipe.

Old Material.—So far as shipments of scrap to steel mill centers are concerned, the market is quieter than it has been for some time. Activity appears to center in scattering carlots of heavy cast at $10.50 to $11 a ton, on cars shipping point; heavy melting steel at $9 and $9.10; cotton ties at $6 to $6.50; No. 2 steel at $7.50 to $7.75, with an occasional lot at $8, and mixed borings and turnings at $6 to $6.25 in most cases. Otherwise activity centers in local or nearby deliveries. One steamer is practically loaded with No. 1 yard steel for Danzig at $9.50 a ton on dock here, an advance of 50c. a ton. Another boat has started to load 4500 tons, and a third will load this month, bringing the total exports for May up to more than 12,000 tons. The advance in price was made with the understanding that automobile scrap would be eliminated. Indications are that exports will continue in June, with a possibility that on this movement more than 20,000 tons of scrap will have been taken out of New England. Foundries have bought textile machinery cast, mostly at $14 a ton, delivered, and No. 1 machinery cast at $14.50 to $15, with an occasional sale at $15.50 where the freight rate has been favorable.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.10
Scrap T rails	8.50 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	10.00 to 10.25
No. 1 yard wrought	7.50 to 8.00
Machine shop turnings	5.50 to 6.00
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	5.75 to 6.25
Forge flashings	6.60 to 7.25
Blast furnace borings and turnings	5.75 to 6.25
Forge scrap	6.00 to 6.25
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe 1 in. in diameter, (over 2 ft. long)	7.50 to 8.00
Rails for rolling	10.00 to 10.25
Cast iron borings, chemical	9.50 to 10.00
Prices per gross ton delivered consumers' yards:	
Textile cast	$13.50 to $14.00
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	13.00 to 13.50
Stove plate	10.00 to 10.50
Railroad malleable	13.00 to 13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

The Dravo Contracting Co. is building on its own account a modern river and rail transfer dock at Woodlawn, Pa., on the Ohio River, just beyond the Aliquippa works of the Jones & Laughlin Steel Corporation. This is probably the first of several similar projects, since the Youngstown district steel companies still are interested in securing some use of the Ohio River in the inward movement of coal and the outward movement of steel products.

The American Rolling Mill Co. has moved its Pittsburgh office from suite 432 to suite 1632 Henry W. Oliver Building.

Heat-Treating Educational Conference

(*Concluded from page* 1409)

common amounts of the added elements as alloy steels. Alloys of nickel and chromium dominate the field, while alloys of vanadium, molybdenum, tungsten, silicon, manganese and aluminum have wide uses but are distinctly secondary.

Alloy steels are produced in basic and in acid open-hearth furnaces, in electric arc and induction furnaces, in crucibles and in Bessemer converters. In order of importance the basic open-hearth dominates and the basic electric furnace is next.

Nickel, Chromium and Molybdenum as Alloys

Outstanding reasons for the use of nickel as an alloy are that it increases strength without loss of ductility and it lowers the temperature at which steel hardens. The latter advantage results in less scaling and less distortion, especially advantageous with parts finished to shape before treatment.

Chromium is the only alloying element that covers all ranges from carbonizing steel to hard steel, such as ball race steels. These steels demonstrate that physical chemistry is more important than quantitative chemistry, for the analysis is usually easily controlled but physical factors are difficult to govern. Economically, chromium dominates the field because of its wide application, but it has the disadvantages of high critical temperatures and slow diffusion rates. In all carbonized applications, chromium steels are best treated with fused salts or lead baths. In the medium-carbon ranges, they may be treated in any manner if machined to shape after treatment.

Vanadium serves best where hot treatments are severe. Molybdenum is commercially satisfactory in water-hardened parts when the machine work is done after treatment. A combination of molybdenum and aluminum serves well for surface-hardening applications that are to be nitrated. Serious trouble is encountered in cooling nickel-molybdenum steels if much carbon is present. This combination requires further study, because the depression of the critical temperature of nickel is pronounced when molybdenum is present.

Metal Fatigue Shown by Motion Pictures

Motion pictures and many photomicrographs taken of specimens when being subjected to repeated alternating stresses were shown by H. F. Moore, professor of engineering materials University of Illinois, Urbana, Ill., who spoke on "The Fatigue of Metals." The motion pictures plainly showed the development of slip planes, followed by the opening of the cracks. Professor Moore pointed out that slipping in itself is not serious, provided that nothing else happens, but this situation rarely occurs, because repeated slippage is almost certain to result in actual fracture or cracks. The rate of slip increases rapidly as the elastic limit is approached.

Experiments have shown that the unit stresses at the edges of irregularities may be four times the average through the piece. This applies to moving and not to stationary loads. Cracks may readily start at the edges where these stresses prevail. Tool marks and the surfaces remaining after grinding and reaming leave irregular surfaces, notwithstanding their appearance of smoothness to the naked eye. These marks are points of concentration of high stresses, opening chances for cracks and ultimate failure of the part. Cracks often hunt out inclusions, and they seldom follow grain boundaries. In the absence of specific data, fatigue strength may be roughly estimated as 250 times the Brinell number or one-half the tensile strength of the material.

PRICE CUTTING UNETHICAL

Profitless Selling Affects Public Interest as Much as Price Fixing, Says Charles F. Abbott

PRICE cutting is unsound and unethical, and should be just as illegal as collusion among sellers to control prices, said Charles F. Abbott, executive director American Institute of Steel Construction, New York, in an address before the Purchasing Agents' Association of Buffalo on May 9. The remedy lies to a large extent with manufacturers, he added.

"There are many instances on record where manufacturers are selling to the ultimate consumers at prices lower than either the jobber or the retailer could possibly quote," he stated. "Then, again, we experience in many instances the old vicious system of secret rebating with all of its destructive influences. We also find manufacturers who are selling to jobbers or retailers of questionable financial standing, thereby encouraging destructive competition on the part of the incompetent. We witness manufacturers selling to brokers or those who have no rightful position in the cycle of distribution.

"If demoralizing price cutting is to be eliminated and the business transacted on a basis of profit, the manufacturer must exert his leadership. In the formation of his selling policy, he must define fair practices and then vigorously enforce them without any partiality or deviation. One of the most constructive influences is the establishment of a one-price policy, thereby establishing prices and discounts fair to all.

"It is obvious that the problem of the distributers, therefore, becomes the problem of the manufacturers. On the other hand, the distributers cannot expect to profit unless they on their part extend to the manufacturer that degree of efficient distribution which he has a right to expect.

"Price cutting is to be condemned as being unsound and unethical. Society is affected because any industry that fails to make a reasonable profit is a liability. Prosperity depends upon the ability of our business organizations to transact a volume of business upon a basis of reasonable profit.

"The purchasing agent who is interested in the prosperity of his company must recognize that to jeopardize the interests of his principal sources of supply, forcing prices below cost in a vain attempt to obtain a cut price or concession, is the direct means of undermining the whole business structure. The whole problem of purchasing is based upon business procedure, and, while it may appear that in one instance a purchasing agent may be receiving an unusual concession which will enable his concern to quote lower prices, the fact remains that his competitor has probably gone him one better and received an even greater concession.

"It is illegal for manufacturers to get together and control selling prices. It should be just as illegal for any seller to solicit business on a basis of cost or below cost, because public interest is just as seriously affected by business transacted on such a basis as it would be should it be legal to agree upon selling prices for the purpose of obtaining an exorbitant profit.

"There is no more constructive suggestion that I can think of than for purchasing agents and sellers to get together and frankly discuss the problems of buying and selling in the hope that policies may be established and ethics defined which will eliminate unfair methods and create a condition whereby all relations between the buyer and seller can be conducted upon a sound business basis, with the interests of both amply protected.

"The success of the manufacturer of any commodity depends largely upon his ability to create consumer good will, to exploit demand and build up public recognition. Such an investment should be protected by a clear recognition of the rights of the jobber or distributer, and the retailer. Their support must be obtained, as it is through them that service must be extended and applied. If this service is inefficient, the manufacturer suffers and his interests are jeopardized because good will becomes impaired.

"The solution for much of the present demoralization of prices is, to a very large extent, in the hands of the manufacturer or producer, who is the only one who has the power to lead in the campaign to improve conditions, and he can do so if he will exert that leadership which is rightfully his by virtue of his position in the industry."

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	May 15	May 14	May 12	May 11	May 10	May 9
Lake copper, New York	14.37½	14.37½	14.25	14.25	14.25	14.25
Electrolytic copper, N. Y.*	14.12½	14.12½	14.00	14.00	14.00	14.00
Straits tin, spot, N. Y.	52.50	52.20	....	52.00	51.80	51.80
Lead, New York	6.10	6.10	6.10	6.10	6.10	6.10
Lead, St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.40	6.35	6.32½	6.30	6.30	6.30
Zinc, St. Louis	6.05	6.00	5.97½	5.95	5.95	5.95

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, May 15.—Large sales and higher prices have featured copper. Tin is quiet, but prices are slightly advanced. Zinc is also up because of continued uncertainty as to the ore situation. Lead is dull at unchanged prices.

Copper.—Heavy buying of copper last week preceded the issuance of statistics for April that were decidedly favorable to the producers' side of the market. During the past week sales of electrolytic have probably been not less than 75,000,000 lb., much of which was sold for May-June at 14.25c., delivered Connecticut Valley. On Monday producers advanced quotations ⅛c. per lb., but there was further large buying at the higher level. On Tuesday the export price was raised by Copper Exporters, Inc., to 14.62½c., c.i.f. European ports, it having been 14.50c. for some time. Export buying has continued a strong feature of the market, one important transaction involving 2500 tons for France. Lake copper has advanced along with electrolytic and has also had a week of large buying. The copper statistics for April showed a total reduction of refined and blister stocks during that month of 21,000 tons, of which 14,000 tons was in refined stocks and 7000 tons in blister stocks. Export shipments last month were more than 60,000 tons. Production of refined copper last month declined more than 6500 tons from that of March. Total production for the first four months of the year was 499,367 tons, compared with 508,554 tons in the corresponding period last year. Domestic shipments in the four months were 54,000 tons less than in the first four months of 1927, but export shipments were 41,000 tons larger.

Tin.—The past week has been rather uneventful in the tin market. Sales were probably under 1000 tons, and most of this consisted of trades between dealers. In some cases the trades were for the purpose of switching deliveries. Consumers took little or no interest in the market. Most of them are covered for May and June, and although they will need metal for July shipment they are not yet in a mood to come into the market. In part, at least, their indifference may be a result of recent published predictions that production of Malay tin will increase to a point that will tend to relieve any scarcity, and that prices over the next year or so may tend downward rather than upward. In the week the price changes have been upward, ranging from 51.80c. per lb. on May 9 and 10 to a nominal quotation of 52.50c. on May 15. Tin stocks are not large. Dealers who have metal are holding it, but on the other hand there is very little demand for it. London prices today were £232 15s. for spot standard, £232 for future standard, £237 5s. for spot Straits, and the Singapore price was £234 12s. 6d.

Lead.—Buying is in moderate volume and at unchanged prices, namely 6c., East St. Louis, for the outside market and 6.10c., New York, the contract price of the leading interest.

Zinc.—The zinc market is still largely dominated by the ore situation, which is stronger at Joplin, with prospects that the price may be advanced $1 a ton. In the last few days prices paid for zinc have ranged from 6c. to 6.10c., St. Louis. In all probability the 6c. price was on stocks in dealers' hands, and little, if any, metal is now available at less than 6.05c. and sales have been made at 6.07½c., with some interests asking 6.10c. A representative range of the market is 6.05c. to 6.10c.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.25c. to 54.25c.
Tin, bar	55.75c. to 56.75c.
Copper, Lake	15.37½c.
Copper, electrolytic	15.12½c.
Copper, casting	14.37½c.
Zinc slab	7.00c. to 7.50c.
Lead, American pig	7.00c. to 7.50c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	13.00c. to 13.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99 per cent pure)	25.00c. to 26.00c.
Aluminum ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	33.50c. to 34.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	56.50c.
Tin, bar	58.50c.
Copper, Lake	14.85c.
Copper, electrolytic	14.85c.
Copper, casting	14.00c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	60.50c.
Solder, ½ and ½	32.75c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	23.00c. to 24.00c.
Copper, cold rolled, 14 oz. and heavier	25.50c. to 26.50c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	9.50c. to 10.00c.
Zinc sheets open	10.50c. to 11.00c.

Non-Ferrous Rolled Products

Mill prices on copper wire were advanced ⅛c. on May 14 and rolled brass products and copper tubing were advanced ¼c. on May 15. Zinc sheets and lead full sheets are unchanged.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	19.00c.
Copper, hot rolled	23.00c.
Zinc	9.00c.
Lead (full sheets)	9.75c. to 10.00c.
Seamless Tubes—	
High brass	23.87½c.
Copper	24.75c.
Rods—	
High brass	16.75c.
Naval brass	19.50c.
Wire—	
Copper	16.12½c.
High brass	19.25c.
Copper in Rolls	22.00c.
Brazed Brass Tubing	23.00c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 6 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.75c.
Copper, hot rolled	23.00c.
Copper, cold rolled, 14 oz. and heavier	25.25c.
Zinc	10.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., shot nickel is 36c. and electrolytic is 37c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is held at 23.90c. per lb., delivered.

Antimony.—There has been fairly good buying of antimony at 11.25c. per lb., duty paid, for prompt and future deliveries. Some consumers have covered up to and including July and August.

Non-Ferrous Metals at Chicago

This market is marked by moderate activity. Prices for tin and zinc have advanced and quotations on other commodities are steady. A fair volume of business is being done in old metals.

Prices, per lb., in carload lots: Lake copper, 14.37½c.; tin, 53c.; lead, 6.10c.; zinc, 6.10c.; in less-than-carload lots, antimony, 12.75c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

Wheeling Steel Corporation has inquired for 10 gondola and 20 hopper cars.

Chicago, Burlington & Quincy has ordered 10 gas-electric rail motor cars from Pullman Car & Mfg. Corporation.

Interborough Rapid Transit Co. has ordered 23 built-up, bar-type trucks for motor subway cars from American Car & Foundry Co.

Northwestern Pacific is inquiring for from one to seven gas-electric passenger-baggage rail motor cars.

Baltimore & Ohio has purchased 10 70-ft. steel baggage and mail cars from American Car & Foundry Co.

Missouri Pacific has revived its inquiry for five 2-8-4 type locomotives.

New Pipe Warehouse in New York

A downtown warehouse has been opened in New York by E. D. Giberson & Co., 40 Rector Street, New York, distributer of boiler tubes, pipe and welding rods and seamless steel tubing for mechanical purposes. E. D. Giberson & Co. are also Eastern sales representatives for the Lebanon Iron Co., Lebanon, Pa., maker of iron bars, bolts, nuts, spikes and rivets and are agents in the United States for Ferrostahl G. m. b. H., a German iron and steel export organization, and the German tube works, Kronprinz A. G. at Immigrath, Rhineland.

Suspends Proposed Increase in Rates from Atlanta to Gulf Ports

WASHINGTON, May 15.—The Interstate Commerce Commission today suspended, from May 15 to Dec. 15, tariff schedules proposing cancellation of present export and coastwise rates on iron and steel products in carloads from Atlanta, Ga., to Mobile, Ala., and New Orleans, by way of rail lines in connection with the barge line of the Mississippi-Warrior River service, and to apply domestic rates in their place. The tariffs would increase the rates from Atlanta via Mobile to Cuba and other coastwise territory from 18c. per 100 lb. to 27.5c. per 100 lb. From Atlanta via New Orleans to Cuba the present rate of 18c. would be increased to 34c., while the present rate of 20c. to coastwise territory outside of Cuba would also be increased to 34c.

Old Metals, Per Lb., New York

The buying prices represent what the large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.25c.	13.75c.
Copper, heavy and wire	12.00c.	13.00c.
Copper, light and bottoms	10.25c.	11.375c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.00c.	3.50c.
Sheet aluminum	12.75c.	14.50c.
Cast aluminum	12.50c.	14.00c.

FOUNDRYMEN MEET

Thirty-Second Annual Convention of American Association Opens in Philadelphia

PHILADELPHIA, May 15.—The thirty-second annual convention of the American Foundrymen's Association, which began on Monday, promises to be very successful. Attendance at the three technical sessions this morning at the Bellevue-Stratford Hotel on gray iron, steel castings and non-ferrous foundry products was decidedly large. Marked interest, particularly in gray iron, is a feature. Registration is heavy thus far.

The exhibition, the first since the fall of 1926 at Detroit, was formally opened Monday morning by Mayor Mackey of Philadelphia, who, in the presence of city officials and officers of the foundrymen's association, pressed a button in the mayor's reception room which started in motion the power machinery at the Commercial Museum. Exhibits of at least 250 companies present an attractive display which is drawing a large attendance.

The convention committee of the Chamber of Commerce tendered the officers and exhibitors a luncheon Monday at the Museum.

Tonight at the Manufacturers' Club a dinner is being given to 34 of the men who assisted in forming the association in Philadelphia in 1896. Including the officers, past officers and board of directors, 50 men were in attendance.

A new feature this year is four sessions on cupola operation, one each day, led by prominent foundrymen. The first was directed by Dr. Richard Moldenke. The attendance was about 250. The second, held this afternoon, was led by E. J. Lowry.

At the regular business meeting today, the retiring president, S. W. Utley, delivered an address on the functions of the association. Chairmen of the chief committees made their reports. President Utley was unanimously chosen an honorary member. New officers and directors, as published in THE IRON AGE, May 3, were elected.

American Refractories Institute Elects J. M. McKinley President

J. M. McKinley, Crescent Refractories Co., Curwensville, Pa., was elected president American Refractories Institute at its annual meeting at White Sulphur Springs, W. Va., May 8; R. M. Sievers, Evens & Howard Fire Brick Co., St. Louis, first vice-president; W. B. Coullie, Harbison-Walker Refractories Co., Pittsburgh, second vice-president; C. E. Edmunds, McLain Fire Brick Co., Pittsburgh, treasurer, and Miss Dorothy Texter, secretary.

Five well-known specifications were reviewed and the requirements of the specifications discussed at this meeting, with producers, consumers and technicians participating. The desirability of having tests follow service conditions was emphasized, and it was brought out that it has been difficult to interpret the test data available. Indeed, all that has been possible is to stimulate service conditions. Attention to service tests was urged.

FABRICATED STRUCTURAL STEEL

Two Western Pipe Lines to Take 15,000 Tons of Plates—Awards Only 13,800 Tons

WITH a pipe line at Denver requiring 12,000 tons of plates and another at Oklahoma City, 3000 tons, new fabricated structural projects reported during the week totaled 31,400 tons. Awards declined to 13,800 tons, one of the lowest weekly totals in several months. The largest project, a bridge across Lake Champlain at Crown Point, N. Y., took 3000 tons. Awards follow:

STATE OF NEW HAMPSHIRE, 150 tons, highway bridge, to Berlin Construction Co., Inc.

BOSTON, 100 tons, additional work on Sears, Roebuck & Co. warehouse, to New England Structural Co.

HARTFORD, CONN., 125 tons, trade school, to an unnamed fabricator.

CROWN POINT, N. Y., 3000 tons, bridge over Lake Champlain; probably to American Bridge Co., low bidder.

NEW YORK, 2000 tons, apartment building at 720 Park Avenue, to Hay Foundry & Iron Works.

NEW YORK, 275 tons, section of Pier 21, North River, to American Bridge Co.

FLEMINGTON, N. J., 120 tons, bridge for New Jersey State Highway Commission, to Phoenix Bridge Co.

TRENTON, N. J., 125 tons, highway bridge, to American Bridge Co.

PENNSYLVANIA RAILROAD, 200 tons, bridge, to Bethlehem Steel Co.

LEWISTOWN, PA., 1500 tons, silk mill, to McClintic-Marshall Co.

SUNBURY, PA., 1900 tons, highway bridge, to Bethlehem Steel Co.

WILMINGTON, DEL., 300 tons, shop building for Pennsylvania Railroad, to Belmont Iron Works.

DAYTON, OHIO, 200 tons, recreation building, to Massillon Bridge & Structural Co.

CHICAGO, 1700 tons, bascule bridge over Chicago River for Baltimore & Ohio Railroad, to an unnamed fabricator.

OAK PARK, ILL., 180 tons, hotel, to Gage Structural Steel Co.

STATE OF ILLINOIS, 400 tons, highway bridges, to A. C. Wood Co., Rockford, and Wisconsin Bridge Co., Milwaukee.

MINNEAPOLIS, 1600 tons, building for University of Minnesota, to American Bridge Co.; previously reported to an unnamed fabricator.

MINNEAPOLIS, 250 tons, building for Russell Grader Mfg. Co., to American Bridge Co.

SEATTLE, 100 tons, Bon Marche Store, to Wallace Bridge & Structural Steel Co.

PORT TOWNSEND, WASH., 150 tons of plates, two tanks and towers for Zellerbach Paper Co., to Chicago Bridge & Iron Works.

GRAYS HARBOR, WASH., 100 tons of plates, two tanks for Grays Harbor Pulp & Paper Co., to Chicago Bridge & Iron Works.

SAN FRANCISCO, 150 tons of plates for Standard Oil Co., to an unnamed interest.

OAKLAND, CAL., 360 tons, Twentieth Century Market, to Judson-Pacific Co.

LOS ANGELES, 425 tons, warehouse for A. M. Castle Co., to Baker Iron Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 150 tons, mercantile building on North Street.

CAMBRIDGE, MASS., 500 tons, addition to Langdell Hall, Harvard University.

QUINCY, MASS., 200 tons, office building for Granite Trust Co.

NEW YORK, 500 tons, fur storage warehouse on Twenty-eighth Street.

SYRACUSE, N. Y., 2500 tons, office building.

UTICA, N. Y., 250 tons, Oneida County Hospital.

PHILADELPHIA, 3000 tons, Y. M. C. A., previously reported as 2000 tons; general contract to Irwin & Leighton.

PHILADELPHIA, 800 tons, Homeopathic Hospital.

PHILADELPHIA, 250 tons, highway bridge.

PENNSYLVANIA RAILROAD, 500 tons, bridges.

WILKES-BARRE, PA., 1100 tons, Wilkes-Barre Savings Bank.

NORFOLK & WESTERN RAILWAY, 100 tons, bridge.

SOUTHERN RAILWAY, 500 tons, bridge.

CLEVELAND, 655 tons, Parkhurst and Nathan Hale schools.

CLEVELAND, 400 tons, Thirty-seventh Street bridge for Nickel Plate Railroad.

AKRON, OHIO, 500 tons, Loew theater.

TOLEDO, OHIO, tonnage unstated, Masonic Temple.

CHICAGO, tonnage being estimated, office building for Union Carbide & Carbon Corporation.

CHICAGO, 600 tons, addition to billet mill of Interstate Iron & Steel Co.

CHICAGO, 400 tons, St. Michael's High School.

KANSAS CITY, MO., 600 tons, office building for Swift & Co.

OKLAHOMA CITY, OKLA., 3000 tons of plates, water pipe line; general contract let.

FREEPORT, TEX., 400 tons, bridge over Brazos River.

DENVER, 12,000 tons of plates, water pipe line; bids June 1.

TACOMA, WASH., 1600 tons of plates, 51 to 66-in. riveted pipe line; bids in.

TACOMA, 115 tons of plates, 48-in. pipe line; Birchfield Boiler Co., low bidder.

OLYMPIA, WASH., 600 tons, bridge over Queets River; general contract to McGuire & Blakesley, Great Falls, Mont.

EUGENE, ORE., 215 tons, dam, penstock and power house; bids June 4.

SAN FRANCISCO, 700 tons of plates, carfloat for Western Pacific Railroad.

SAN FRANCISCO, 130 to 200 tons, addition to Dollar Building.

OAKLAND, CAL., 1100 tons, office building at Fourteenth and Franklin Streets.

OAKLAND, 250 tons, school at Eighty-seventh Avenue and Foothill Boulevard.

LOS ANGELES, 225 tons, apartment building at 906 North Bonnie Brae Street.

PHOENIX, ARIZ., 260 tons, bridge on Benson-Douglas highway; general contract to Charles & E. W. Steffgen, San Diego, Cal.

Asks Deferring of New Southwestern Rates on Wrought Pipe

WASHINGTON, May 15.—Postponement of the effective date, July 8, of the decision of the Interstate Commerce Commission in the Consolidated Southwestern cases in so far as it affects wrought iron or steel pipe and fittings is asked in a petition filed with the commission by the Transcontinental Oil Co. The petition says that the commission has postponed the effective date as it applies to cast iron pipe and fittings and that the reasons cited for that postponement apply with equal, if not greater force, to wrought pipe, with the exception of the allegation that the value of cast iron pipe is less than the value of wrought iron pipe.

Practically all wrought pipe consumed by the oil industry, it is stated, is purchased directly from the manufacturer and shipped directly to final destination. In all cases where it is necessary, because of an emergency, to purchase from stocks in this field, it is stated, the freight from point of last loading to final destination must be borne by the purchaser, in addition to the transportation cost from point of manufacture to storage point. Due to this fact and the absence of storage-in-transit provisions, and also because of the large consumption of wrought pipe in the affected territory, it is declared, competition between jobbing points, so marked on other commodities, "does not now and probably never will prevail." It is submitted by the petitioner that there is less competition between jobbing cities in the Southwest on wrought iron pipe than on cast iron pipe. It is pointed out that the minimum weight of 40,000 lb. prescribed on wrought pipe is 72.1 per cent of the average loading in the Southwest, 55,480 lb., while the other minimum weights prescribed on iron and steel products range from 78.4 per cent to 90.4 per cent of the average loading. The general minimum weight on wrought pipe in the Southwest at the present time is 46,000 lb. The average weight of wrought iron pipe received by the Transcontinental Oil Co. is declared to be 68,000 lb. It is contended that consumers of wrought pipe should not be penalized by having this product placed with other iron and steel products on a higher rate than is justifiable on wrought pipe because of its heavier loading and the absence of the commercial characteristics that prevail on other iron and steel products.

It is urged that transportation and commercial conditions affecting wrought pipe are such as to warrant its separation from the other articles of iron and steel.

PERSONAL

C. F. W. Rys, since 1911 metallurgical engineer in charge of the metallurgical department of the Carnegie Steel Co., Pittsburgh, has been made an assistant to the president. He has been with the Carnegie company since 1904 and is a graduate of the School of Mines, Freiberg, Saxony. He achieved considerable distinction as a member of committees of national engineering societies in connection with work done on standard specifications for iron and steel materials and products. He is a member of the American Iron and Steel Institute, Iron and Steel Institute (British), and the American Society for Testing Materials, and is on the metallurgical advisory board of the Carnegie Institute of Technology.

C. F. W. RYS

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E. J. Lowry, until recently metallurgist for Hickman, Williams & Co., Pittsburgh, but more recently engaged in consulting engineering work, with offices in the General Motors Building, Detroit, has been engaged as a consulting metallurgist by the Molybdenum Corporation of America, Pittsburgh, to further the use of molybdenum in iron and steel.

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W. P. Gleason, general superintendent Gary, Ind., works, Illinois Steel Co., has been named a member of the board of trustees of the Lake County, Ind., Tuberculosis Sanitarium.

—

A. T. Leavitt has been made president of the Hamilton By-Product Coke Ovens, Ltd., Hamilton, Ont.

—

O. W. Stokes has been transferred from the Seattle to the San Francisco office of the Worthington Co., Inc., and is now located at 543 Howard Street, San Francisco.

—

Harry E. Kies, executive manager of the malleable iron department of the American Radiator Co., Buffalo, has also taken over the activities of the Arco steel department and is now manager of both plants. He succeeds E. P. Langworthy in the Arco department.

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Fred A. Hanlin was elected secretary Weirton Steel Co., Weirton, W. Va.; Frank M. Hesse was elected treasurer, T. J. Hudson, assistant secretary, and W. L. Horner, assistant treasurer at a special meeting of the directors of the company held in Pittsburgh, May 8. Mr. Hanlin and Mr. Hesse previously were respectively assistant secretary and assistant treasurer of the company, the official personnel of which, except for these promotions, is unchanged.

—

J. E. Heber has been elected vice-president of the Truscon Steel Co., Youngstown, in charge of its Pacific Coast activities, with headquarters at Los Angeles. For the past 17 years he has been district manager for the company in that city, and for the preceding five years he was connected with the Truscon sales organization in Canada.

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A. Levin, for the past two years connected with the Pacific Coast sales organization of the Minneapolis Steel & Machinery Co., Minneapolis, has joined the sales organization of the Moore Drydock Co., Oakland, Cal.

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Hans J. Meyer has been made an engineer of the foreign department, International Combustion Engineering Corporation, New York, and will sail on June 6 for the Far East. Mr. Meyer's early engineering training was with the Milwaukee Electric Railway & Light Co. His later identifications were as district engineer Allis-Chalmers Co.; sales engineer Westinghouse Electric & Mfg. Co.; superintendent Shreveport Gas, Electric Light & Power Co., Shreveport La.; partner in the consulting engineering firm of Vaughn, Meyer & Sweet, Milwaukee; and partner in the consulting engineering firm of Charles L. Pillsbury Co., Minneapolis and St. Paul. During the war he served as administrative engineer, United States Fuel Administration, Bureau of Conservation. He became identified with Combustion Engineering Corporation in 1926 and was placed in charge of design and construction of complete fuel burning and steam generating equipment for the Kip's Bay station of the New York Steam Corporation.

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H. N. Smith has been appointed district sales manager of a new office which has been opened at 48 West McLemore Avenue, Memphis, Tenn., by the Linde Air Products Co., New York. His territory will include western Tennessee, northern Mississippi and eastern Arkansas.

—

Charles S. Garland, New York district manager for Hickman, Williams & Co., has resigned to become associated with Brown Brothers & Co., New York investment bankers. He has been associated with Hickman, Williams & Co. since his graduation from Yale University in 1920, for four years in the company's Pittsburgh office and since November, 1924, as district manager at New York.

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Earl D. Stearns, formerly with the Stearns Conveyor Corporation, Cleveland, has been appointed vice-president of the Fairfield Engineering Co., Marion, Ohio, manufacturer of conveying equipment.

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Messrs. Nagel and Blumenfeld, general manager and director respectively of the Badische Machine Works, Durlach, Germany, manufacturer of foundry equipment, arrived in the United States on May 7 and will visit the convention of the American Foundrymen's Association in Philadelphia, and also numerous foundries and equipment companies in this country. They will maintain headquarters at Albert T. Otto & Sons, Inc., 18 East Forty-first Street, New York, agent in the United States for the Durlach works.

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Henry D. Sharpe, president Brown & Sharpe Mfg. Co., Providence, R. I., has been made vice-president of the American Association of Community Chests and Councils. He is president of the Providence Community Chest.

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C. H. Heist, formerly furnace superintendent Mayville Iron Co., Mayville, Wis., subsidiary of the Youngstown Sheet & Tube Co., has been named superintendent in charge of all blast furnaces of the latter company, with headquarters in Youngstown.

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Allen Wood Smith has been appointed manager of the roll sales department, Aetna Standard Engineering Co., Youngstown. Associated with him is Robert G. Crawford, formerly with the Mesta Machine Co., Pittsburgh.

—

W. C. Fownes, formerly president Standard Seamless Tube Co., Pittsburgh, now head of Fownes & Orr Co., Inc., has been elected a director McKinney Mfg. Co., Pittsburgh, hardware manufacturer. J. B. Orr, associated with Mr. Fownes, also has been elected a director of the McKinney company.

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W. B. Ohl, formerly auditor Trumbull Steel Co., has been appointed to the newly created office of comptroller of the Republic Iron & Steel Co., Youngstown. Harry D. Rhodehouse, for many years traffic manager Youngstown Chamber of Commerce, has been appointed traffic manager of the Republic company.

Charles L. Hyland has been appointed sales representative for the Empire Steel Corporation, Mansfield, Ohio, in the Cincinnati territory. His district will include portions of Ohio, Kentucky, Tennessee and West Virginia. Mr. Hyland was formerly with the Wheeling Steel Corporation, Wheeling, W. Va., and more recently with the Trumbull Steel Co., Warren, Ohio. His address is 3437 Hazelwood Avenue, Cincinnati.

—

W. B. Ohl, formerly general auditor of the Trumbull Steel Co., has been appointed comptroller of the Republic Iron & Steel Co.

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Louis Renault, head of Societe Anonyme des Usines Renault, French automobile manufacturer, and E. C. Serre and E. A. Tordet, chief engineer and factory manager of the Renault company, are in this country devoting considerable time to inspecting automobile and parts making plants. At Flint, Mich., M. Renault and party were the guests of B. W. de Guichard, president AC Spark Plug Co.

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Reginald G. Matthews, Floral Park, N. Y., has been appointed assistant chief of the industrial machinery division, Department of Commerce, Washington. He was born at Orange, N. J., and attended Pratt Institute, Brooklyn, and other technical schools, specializing in mechanical and electrical engineering. His experience includes extensive travel abroad and in the United States selling and estimating machinery, and service with a financial house, which took him to Japan. During the World War he served in the United States Ordnance Department.

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Eugene G. Grace, president Bethlehem Steel Co., Bethlehem, Pa., and G. H. Blakeley, vice-president, are on a business trip to the Pacific Coast.

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A. F. Morris, vice-president and general manager of sales Morgan Engineering Co., Alliance, Ohio, has been elected president. He was appointed sales manager in 1903 and in 1923 was elected vice-president.

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Henry F. Angelberger, engineer for the H. K. Ferguson Co., Cleveland, will sail for Japan on May 17 to take charge of the company's construction work in that country.

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Thomas G. Kus, formerly with the St. Louis Gas & Coke Corporation, Granite City, Ill., has been appointed vice-president of the Arthur L. Stevens Corporation, 205 West Wacker Drive, Chicago, furnace engineer.

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T. L. Simpson has been placed in charge of a branch office which has been opened at 1209 Empire Building, Pittsburgh, by the American Cast Iron Pipe Co., Birmingham.

Welding Prizes Awarded at Meeting of Mechanical Engineers

PITTSBURGH, May 15.—The Lincoln arc welding prizes were awarded at the business session of the American Society of Mechanical Engineers, which is now holding its spring meeting at Pittsburgh. Three awards were made for essays which were held to contribute materially to the art of arc welding. The society had engaged some time ago to conduct the competition and had appointed a committee of judges under the chairmanship of L. P. Alford, J. F. Lincoln, president Lincoln Electric Co., Cleveland, explained the purpose of the contest as aiming particularly toward advancement of the art. The first prize, carrying a check of $10,000, was awarded to James W. Owens, director of welding Newport News Shipbuilding & Dry Dock Co. His paper was entitled "Arc Welding, Its Fundamentals and Economics." It covers design and shop practice, together with an analysis of industrial applications and world-wide possibilities.

C. F. Bailey, engineering director Newport News company, represented President Homer Ferguson in expressing pleasure at the award and eulogy of the winner. The second prize went to Prof. Henry Dustin, of the faculty of applied science, University of Brussels, Belgium. This was for $5,000. The third prize, $2,500, was awarded to Com. H. E. Rossell, mathematics department, Naval Academy, Annapolis.

OBITUARY

ARCHER MAYNARD CAMPBELL, chairman of the board of the Glamorgan Pipe & Foundry Co., Lynchburg, Va., whose death on May 7 was metioned in THE IRON AGE last week, was born at Lynchburg in 1873 and had been identified with the Glamorgan company since 1888. He began work in clerical capacities and was advanced through various executive positions until he became president of the company in 1916. He had been chairman since 1921. Mr. Campbell had taken an active part in the industry with which he had been identified and had served as chairman of the Cast Iron Pipe Research Association since its formation in 1915. He was also a councillor in the United States Chamber of Commerce and was a director of the United Cigarette Machine Co. and of numerous other financial and industrial companies. A brother, H. L. Campbell, is president of the Glamorgan company.

A. M. CAMPBELL

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MICHAEL BLAKE, for many years president Federal Iron & Metal Co., Newark, N. J., died on April 30 at Tucson, Ariz., where he had been living since the first of the year on account of illness. He was 59 years of age and had been engaged in the scrap metal business in the East for more than 40 years. During the war he served on the Mayor's Committee of National Defense of New York, and at the time of his death he was a member of the American Iron and Steel Institute and of the Chamber of Commerce of Newark.

Memory of Charles A. Coffin Honored

In the presence of more than 10,000 employees, the board of directors and a few invited guests, a bronze tablet honoring the memory of Charles A. Coffin, founder of the General Electric Co., was unveiled by Miss Alice Coffin, his daughter, May 8, at the Schenectady plant of that company. Elaborate ceremonies included an address by E. W. Rice, Jr., honorary chairman of the General Electric board. The fund which made the tablet possible was established 25 years ago by General Electric employees.

Industrial activity in the New England States in the first quarter of the year is estimated by *Electrical World* at 113.7, on the basis of 100 as the average monthly figure for 1923 to 1925. This shows a reduction of 2.7 per cent from the average of 116.8 for the first quarter of 1927. A number of industries, however, showed a gain, these including chemicals, leather, metals, paper and rubber. The metals were 126.5, against 118.7 a year earlier.

Where Steel Exports Went in First Quarter

Canada Took 119,249 Tons of Nine Leading Items—Japan Retains Second Position with 42,268 Tons, Followed by Philippines, 12,153 Tons; Argentina, 11,505 Tons; Brazil, 10,923 Tons; Mexico, 10,467 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*12,787*	*10,027*	*33,991*	*30,347*	*15,531*	*13,428*	*37,947*	*44,362*	*13,292*	*15,433*	*44,135*	*48,647*
Canada	10,784	9,143	28,959	23,676	3,072	2,936	7,397	7,150	6,533	6,587	15,810	18,101
Japan	8	64	355	312	548	227	644	733	4,978	7,115	22,130	24,367
Cuba	38	35	97	91	510	906	1,402	4,191	239	137	650	329
Philippine Islands	591	109	649	123	2,715	1,068	7,066	5,178	97	580	860	1,083
Mexico	78	62	150	114	563	668	1,490	1,680	160	....	505	439
Argentina	....	....	....	....	535	1,148	1,910	3,041	174	228	454	615
Chile	....	....	....	....	....	78	....	741	33	13	61	453
Colombia	....	....	....	....	389	595	1,672	2,168	....	....	217	215

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*15,798*	*13,701*	*54,403*	*55,844*	*7,076*	*3,463*	*17,031*	*7,871*	*5,072*	*2,663*	*12,070*	*7,175*
Canada	699	788	1,885	3,802	610	708	951	966	2,299	1,912	4,944	4,336
Japan	1,462	1,255	3,358	14,690	....	....	....	....	108	11	224	382
Cuba	46	295	596	3,939	370	63	929	222	103	70	164	306
Philippine Islands	....	....	3,236	....	....	....	303	....	....	....	39	....
Mexico	1,372	865	2,166	2,208	468	449	1,517	952	238	250	550	511
Argentina	....	....	1,360	....	....	....	3,154	....	....	....	....	....
Chile	2,409	7	7,513	10	....	....	67	....	....	....	....	....
Colombia	865	152	3,081	397	486	302	948	....	....	....	....	....
Brazil	2,514	5,501	7,134	12,586	1,675	237	3,539	493	44	23	250	78
Australia	....	....	....	....	....	....	....	....	259	81	259	302

	Tin Plate				Steel Bars				Plain Heavy Structural Material			
	March		Three Months Ended March		March		Three Months Ended March		March		Three Months Ended March	
	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927
Total	*22,755*	*26,817*	*60,552*	*97,468*	*12,005*	*9,115*	*30,566*	*31,504*	*15,148*	*8,976*	*38,366*	*25,146*
Canada	4,439	5,204	9,804	12,978	7,182	5,648	18,429	18,069	11,682	7,182	31,070	19,404
Japan	2,769	5,741	14,438	20,095	39	213	252	328	329	436	867	755
Cuba	650	275	1,053	870	598	297	1,194	608	606	718	1,320	1,909
Mexico	2,018	39	4,089	3,349	210	....	....	....	....	....	....	....
Argentina	2,260	4,250	4,627	15,904	....	....	....	....	....	13	....	136
Chile	311	163	909	1,470	....	....	....	....	158	163	636	290
Brazil	1,045	....	....	2,048	....	....	....	....	....	....	....	....
China	2,647	3,240	3,650	7,317	....	....	....	....	....	....	....	....
British India	1,627	154	1,627	3,369	....	....	....	....	....	....	....	....
United Kingdom	74	607	74	3,960	1,586	957	4,271	5,823	....	....	....	....
Italy	2,142	1,466	3,611	3,471	....	....	....	....	....	....	....	....

Destination of All Iron and Steel Exports from the United States

(In Gross Tons)

Country of Destination	March, 1928	January through March 1928	January through March 1927
North and Central America and the West Indies	*116,916*	*288,724*	*242,371*
Canada and Newfoundland	93,678	231,485	182,093
Cuba	6,364	16,800	21,920
Mexico	9,414	20,002	19,906
Guatemala	447	4,364	2,544
Panama	2,478	4,507	3,899
Salvador	219	731	1,247
British West Indies	743	1,762	3,026
Other West Indies	1,302	4,759	3,973
Other Central America	2,271	4,314	3,763
South America	*39,803*	*104,239*	*111,422*
Argentina	8,113	23,568	24,783
Brazil	9,421	20,211	24,779
Chile	5,860	18,120	6,102
Colombia	6,083	16,825	22,700
Peru	4,095	8,269	3,956
Uruguay	841	1,799	4,595
Venezuela	4,694	13,970	23,932
Other South America	696	1,477	575
Europe	*14,467*	*39,784*	*35,028*
Belgium	616	3,699	793
France	328	817	670
Greece	45	117	800
Italy	2,328	4,011	4,108
Netherlands	164	796	1,023
Russia	20	1,222	1,149
United Kingdom	4,036	13,262	20,069
Other Europe	6,921	15,860	6,416
Far East	*49,015*	*176,519*	*160,167*
British Malaya	851	1,921	4,250
China	9,451	32,957	22,253
Dutch East Indies	2,340	6,403	12,025
India and Ceylon	3,492	9,620	11,728
Japan and Chosen	19,344	91,884	80,748
Kwangtung	344	1,870	4,517
Philippine Islands	10,868	25,484	11,455
Australia	1,296	4,478	7,776
New Zealand	54	496	475
Other Asia and Far East	975	1,406	4,940
Africa	*1,734*	*4,350*	*4,463*
British South Africa	794	2,140	1,513
Egypt	685	1,419	1,411
Mozambique	38	208	1,149
Other Africa	217	583	390
Total	221,935	613,619	553,451

Machinery Markets and News of the Works

BUSINESS STEADY

Demand Well Distributed and Tools Are Largely for Replacement

New Inquiry Includes Equipment for Chicago Continuation School

ALTHOUGH there has been a slight decline in machine tool orders in some districts, the letdown is attributed to seasonal conditions and little significance is attached to it by some of the larger builders. Pending business is still of good volume, and, taken as a whole, market activity may be characterized as steady.

Favorable conditions are also indicated by the monthly review of the National Machine Tool Builders Association, issued May 10, which points out that indexes used to measure general business conditions are rather uniformly favorable, and that the machine tool industry is no exception to this general rule.

"Demand for machine tools seems to have been coming from broadly distributed sources, without such concentration in the automotive industry as there was in 1923 and 1924," states the review. "The result is a healthier demand. Another favorable factor is that the business coming out is very largely a replacement rather than an expansive business."

The railroads have shown little interest in the market during the past week. Activity in the Detroit district has been slow, and business from some of the companies that have taken Ford contracts has not been of the volume expected.

Among new inquiries is a list of three tools for a continuation school in Chicago. Orders for the nine machines for the Alexander Hamilton junior high school, Cleveland, have been placed.

It is reported in New England that good demand for small tools continues, the volume of this business so far this month being greater than that in the same period in April, the best month to date in 1928.

Price advances in woodworking equipment are noted in the Cleveland district.

New York

NEW YORK, May 15.

REPORTS from the local machine tool trade quite uniformly point to a slight falling off in business in the first half of May, compared with the last half of April. A fair amount of buying is being done, however, and a good deal of inquiry is pending. Sales are frequently governed by the promise of delivery rather than price. Some machine tool builders have certain sizes and types of machines in stock, while others quote deliveries ranging from one to three months. Mack Trucks, Inc., has bought a few machines for its New Brunswick, N. J., plant. The New York, New Haven & Hartford Railroad has inquired for a few machines. The New York Central Railroad continues to send out inquiries, but has done very little buying. A promising prospect for the near future is the large requirements of the Wright Aeronautical Corporation, but no inquiries have yet appeared.

The Niles-Bement-Pond Co., including the Pratt & Whitney division, reports the following sales: A 6-ft. plain Right-Line radial drill, a 60-in. horizontal boring mill, a Cincinnati No. 2 B I high-speed drilling machine, a Ransom No. 109 grinder, a Long & Allstatter vertical I-beam punch, a Brown & Sharpe No. 1 wire feed screw machine, an Oster 16-in. shaper, a used 48-in., 200-ton wheel press, a 13 x 48-in. lathe, a 16 x 36-in. lathe, three 5-in. production hand milling machines, a No. 2 jig borer, a 12-in. vertical shaper, a 14-in. surface grinder, two 3-spindle Sigourney drilling machines.

Chain Products Co., Cooper Avenue and Pennsylvania Railroad, Cleveland, manufacturer of Hodell chains, has removed its New York office from 150-152 Chambers Street to 200 Varick Street. Thomas A. Troy is the New York manager.

Ireland Aircraft, Inc., Garden City, N. Y., has been organized to manufacture flying boats. Company has plant at Garden City, where entire plane is built, with exception of motor, instruments, etc., and is in market for materials.

Automatic Metal Drawing & Stampings, Inc., 30 Church Street, New York, has been formed to manufacture sheet metal drawings and stampings. Company also make dies when not supplied by customer. Plant is in New York.

Contract has been let by New York, New Haven & Hartford Railroad Co., Grand Central Terminal, New York, to Babor-Comeau & Co., Inc., same address, for proposed two-story electric inspection and operating shop, 106 x 375 ft., on Mathews Avenue, to cost $180,000, with equipment.

Nichols Copper Co., Laurel Hill, L. I., has disposed of block of 140,000 shares of stock to net more than $4,000,000, entire proceeds to be used exclusively for new electrolytic copper refining plant in southwestern district; site will soon be selected. An option has been secured on property in Ascarate district, near El Paso, Tex., with view to utilizing for proposed mill. Plans will soon be drawn. Company is affiliated with Calumet & Arizona Mining Co., New Cornelia Copper Co., and Phelps Dodge Corporation, 99 John Street, New York. C. Walter Nichols is president; Frank E. Lee is secretary. Walter Douglas, president of Phelps Dodge organization, will be active in project.

Andrew J. Thomas, 2 West Forty-sixth Street, New York, architect, has filed plans for extensions and improvements in two-story service, repair and garage building at 335-37 East Forty-seventh Street, reported to cost close to $100,000, with equipment.

Superintendent of Lighthouses, Staten Island, N. Y., is asking bids until May 21, for four 2-kw. automatic gasoline engine-driven generator units, proposal 26993.

Purty Boat Works, Inc., Bayview Colony, Port Washington, N. Y., has awarded general contract to Standard Erecting Corporation, 551 Fifth Avenue, New York, for one-story boat-building and ship repair works, to cost about $175,000 with equipment. Ned Purty is president.

Department of Plant and Structures, Municipal Building, New York, will soon begin construction of municipal airport on Barren Island, Jamaica Bay, comprising hangars, equipment and repair shops, oil storage and distributing buildings and other mechanical units, estimated to cost $500,000, in which amount appropriation has been made.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in new baking plant unit to be built by Cox Baking Co., Inc., Van Wyck Boulevard and Ninety-first Street, Jamaica, L. I., reported to cost about $100,000.

Hugo E. Magnuson, 420 Lexington Avenue, New York, architect, has plans under way for five-story automobile service, repair and garage building at 1076-82 First Avenue, to cost approximately $190,000 with equipment.

Street Cleaning Department, Municipal Building, New York, has been granted appropriation of $2,052,495, by Board of Estimate, for construction of six steel and con-

The Crane Market

THERE is only a small volume of new inquiry for electric overhead and locomotive cranes. No action has been taken as yet by Dwight P. Robinson & Co., New York, on six crawl tread locomotive cranes and seven steam shovels for use at Buenos Aires, Argentina. The Mullaney Iron Works, West New York, N. J., is about to close on a 10-ton, 60-ft. span, electric traveling crane. Two 15-ton lumber handling cranes and a 10-ton crawl tread locomotive crane for the Franklin Lumber Co., Newark, N. J., are still pending.

Among recent purchases are:

New York Edison Co., New York, 100-ton, 31-ft. 8-in. span, 3-motor overhead crane from Niles Crane Corporation.

General Electric Co., Schenectady, N. Y., 15-ton, 90-ft. span, 4-motor gantry crane reported purchased from Alliance Machine Co.

Public Service Production Co., Newark, N. J., 10-ton, 17-ft. 8-in. span hand power crane for Trenton, N. J., from New Jersey Foundry & Machine Co.

La Cour Iron Works, Hunters Point Avenue, Brooklyn, N. Y., 7½-ton, 45-ft. span, 3-motor overhead crane from Box Crane & Hoist Corporation.

Gilbert & Barker Mfg. Co., Springfield, Mass., two 5-ton electric transfer cranes, two 1-ton single I-beam cranes, one 5-ton and one 2-ton electric hoists from an unnamed builder.

Gaffney Construction Corporation, Zerega and Storey Avenues, New York, two 7½-ton crawl tread locomotive cranes from Browning Crane Co.

Welker & Wade, Inc., New York, one truck crane from Browning Crane Co.

Atchison, Topeka & Santa Fe, six gib cranes for several of its shops from unnamed bidder.

Link-Belt Co., Chicago, 15-ton electric crane from Shaw Electric Crane Works and a 5-ton and two 3-ton overhead electric cranes from Cleveland Crane & Engineering Co.

crete dumping and handling stations on waterfront, replacing present wooden units, with installation of unloading, conveying and other mechanical handling equipment.

Westchester Service Corporation, New Rochelle, N. Y., recently formed to take over and consolidate group of ice manufacturing plants at Mount Vernon, New Rochelle, Port Chester, White Plains and Yonkers, is disposing of preferred stock issue to total $600,000, a portion of proceeds to be used for extensions and improvements.

Board of Education, Park Avenue and Fifty-ninth Street, New York, has arranged fund of $476,000, for mechanical equipment in proposed three-story Samuel Tilden high school at Beverly Road and East Fifty-ninth Street, Brooklyn, for which plans will soon be completed. Entire structure will cost $1,891,000.

In connection with proposed future development of its properties, Cerro de Pasco Copper Corporation, 44 Wall Street, New York, contemplates installation of electrolytic zinc plant, with water power facilities and other expansion, estimated to cost $5,000,000. E. H. Clark is vice-president.

United Electric Light & Power Co., 130 East Fifteenth Street, New York, has plans for two one-story equipment storage and distributing buildings, with repair facilities, each 35 x 136 ft., at Walnut Avenue and 134th Street, to cost $50,000. Thomas E. Murray, Inc., 55 Duane Street, is architect and engineer.

Signal Corps Procurement District, Governors Island, New York, is asking bids until May 22, for 250 manhole frames and 200 manhole covers, circular 158.

Village School Board, Dobbs Ferry, N. Y., has plans for a one-story trade school building and mechanical shop for automobile work. P. B. Nichols, Depot Plaza, West Plains, N. Y., is architect.

Frederick J. Maywald, William and Main Streets, Belleville, N. J., chemist, and associates are organizing new company to be known as Fremay Co., to establish and operate plant at Carlstadt, N. J., for manufacture of rubber products. Former factory of S. Klaber & Co., Hoboken Road and Tenth Street, Carlstadt, marble and stone products, has been acquired, and will be remodeled and equipped at early date.

Simmons Co., Brunswick Avenue, Linden, N. J., manufacturer of brass and other metal bedsteads, with main plant at Kenosha, Wis., has plans for a new one-story addition to local factory, including improvements in present plant, reported to cost in excess of $50,000. Company has arranged for increase in capital from 1,000,000 to 2,000,000 shares of stock, no par value, portion of fund to be used for expansion at different branch plants throughout country.

North Jersey District Water Supply Commission, 24 Commerce Street, Newark, contemplates installation of new pumping plant in connection with water supply system at Wanaque, N. J., to cost $300,000, with machinery. George W. Fuller is engineer.

D. W. May, Inc., 380 Central Avenue, Newark, electrical equipment and supplies, automotive specialties, etc., has plans in progress for two one-story factory units, reported to cost more than $50,000. Marshall N. Shoemaker, 15 Central Avenue, is architect and engineer.

Syndicate Toy & Novelty Co., 181 Chestnut Street, Newark, has leased space in factory at 339 Chestnut Street, for expansion. Present works will be removed to new location and capacity increased.

American Telephone & Telegraph Co., 195 Broadway, New York, has acquired tract of land between Netcong and Flanders, Morris County, N. J., as site for new radio receiving station for trans-Atlantic service, to include steel towers, power station, etc.

Sonatron Tube Co., 88 Eighth Avenue, Newark, manufacturer of radio equipment, is disposing of a stock issue to total about $652,000, a portion of fund to be used for expansion.

Board of Public Works, City Hall, Paterson, N. J., will receive bids until June 12, for refuse destructor plant equipment, including monorail grab-bucket type electric hoist; electric skip and tub hoists, ash bunker, tunnel trackage, tip cars, and movable hopper; pneumatic ash conveyor system complete; and ventilating, air washing and chlorinating system complete. Plans and specifications at office of city engineer, City Hall.

New England

BOSTON, May 15.

MACHINE tool dealers in New England States except Connecticut report little business of importance. Connecticut dealers are getting some good business, particularly in lathes, radial drills, milling machines and grinding equipment. Quite a few Connecticut industrial plants are running well in excess of operations a year ago, and practically all of those directly or indirectly affiliated with the iron and steel business are more active than they have been in a long time. Among sales reported locally the past week were a new 20-ft. x 12-in. Monotrol lathe, a new 20-in. upright drill, a new 10-ft. bending roll, and a large used planing machine. Quite a few core making machines were sold to foundries. The Boston & Albany Railroad may make purchases this week. Small tools continue to sell freely.

The General Electric Co. has booked 28 electric-drive equipments for gasoline buses for the Boston Elevated Railway.

New company to be known as the Maine Steel Products Co. will shortly be announced. It will practically be a re-establishment of the Union Iron Works, Bangor, Me., but will be located at South Portland. It is to manufacture steel snow plows, snow removal machines and various other types of highway construction equipment.

Baird Machine Co., Bridgeport, Conn., is to erect one-story, 110 x 150-ft. machine shop to cost, without equipment, $80,000.

Davis-Furber Machine Co., Water Street, North Andover, Mass., has started a two-story, 30 x 50-ft. foundry addition.

George Howard & Sons Co., Brockton, Mass., has been awarded contract to build a two-story cold storage plant for Cudahy Packing Co., at North Montello, Mass. Conveying equipment is required.

Fafnir Bearing Co., New Britain, Conn., has been granted permission to build a two-story, 60 x 70-ft. and a one-story, 60 x 120-ft. plant additions to cost, without equipment, $56,000.

Kenney Mfg. Co., Wellingford Avenue, Cranston, R. I., curtain rods, has started work on a two-story, 66 x 120-ft. plant addition. E. B. Whipple, Weybosset Street, Providence, R. I., is engineer.

Real estate, machinery and equipment of Vermont Machine Co., Inc., Bellows Falls, Vt., will be sold at public auction May 17 and 18.

Boston Gear Works, Inc., Norfolk Downs, Mass., manufacturer of standardized gears, speed reducers and power transmission equipment, has erected brick and concrete plant addition, 67 x 95 ft. Building is of three stories, the third given over to company's recreation facilities.

Contract has been let by Collyer Insulated Wire Co., North Main Street, Pawtucket, R. I., manufacturer electrical wires, etc., to Henry M. Soule, 110 Brook Street, for a three-story addition, 75 x 105 ft. to cost about $115,000 with equipment. Monahan & Meikle, Main Street, are architects.

Ever-Spark Plug Co., Inc., Fitchburg, Mass., has acquired one of local mill units of Grant Yarn Co., for consideration of $38,000, and will equip for a new plant.

Rumford Falls Power Co., Rumford, Me., controlled by Oxford Paper Co., same address, has arranged for bond issue of $2,000,000, a portion of fund to be used for expansion in generating and transmission facilities. Hugh J. Chisholm is president.

Connecticut Light & Power Co., Hartford, Conn., has awarded contract to United Gas Improvement Contracting Co., Broad and Arch Streets, Philadelphia, for additions to gas storage and distributing works on Harbor Avenue, Norwalk, Conn., to cost $150,000.

William H. Haskell Co., Bailey Street, Pawtucket, R. I., manufacturer of expansion bolts, studs, etc., has awarded general contract to Cruise Construction Co., Pawtucket, for one-story addition to machine shop, 60 x 66 ft. Warren B. Lewis is engineer.

Atlas Plywood Corporation, 31 St. James Avenue, Boston, has arranged for increase in capital stock from 50,000 to 100,000 shares, no par value. A bond issue of $2,500,000 is being sold, a considerable portion of proceeds to be used for expansion, including acquisition of Empire Mfg. Co., Goldsboro, N. C., manufacturer of textile frames and equipment, and for expansion of such line of production in Southern territory.

Rosenblatt Brothers, Mallaney Building, Framingham, Mass., architects, will soon begin construction of one-story automobile service, repair and garage building, 100 x 140 ft., at Union Avenue and Mount Wayte Road, to cost about $90,000 with equipment.

C. H. Smith Corporation, 33 Sylvan Street, West Springfield, Mass., manufacturer of wire cloth, etc., has begun erection of one-story addition, 36 x 70 ft., for which general contract was let recently to Unit Construction Co., Springfield. R. G. Milliken is manager.

Raybestos Co., Bridgeport, Conn., manufacturer of automobile brake lining, etc., is disposing of stock issue to total $1,960,000, portion of fund to be used for expansion. Company operates subsidiaries and branch plants at Stratford, Conn., Charleston, S. C., and Peterborough, Ont. Sumner Simpson is president.

Henry Weyand Co., Brown Place, Waterbury, Conn., manufacturer of pipe, pipe bends, etc., has plans nearing completion for one-story addition, 18 x 105 ft., for which bids will be asked by Thomas M. Freney, Waterbury, architect.

Greenfield Electric Light & Power Co., Greenfield, Mass., has secured permission to dispose of stock issue totaling 300,000 shares, a portion of proceeds to be used for expansion and improvements.

St. Louis

ST. LOUIS, May 15.

PLANS are being considered by International Oil Heating Co., 3939 Magnolia Street, St. Louis, manufacturer of oil burning equipment for a new one-story plant, reported to cost about $20,000.

Cudahy Packing Co., 111 West Monroe Street, Chicago, meat packer, has awarded general contract to Miller-Straub Construction Co., Railway Exchange Building, Kansas City, Mo., for new six-story packing plant, with power and refrigerating departments, at Kansas City, Kan., to cost approximately $400,000, with equipment.

Officials of Braden Steel & Winch Co., Tulsa, Okla., manufacturer of sectional steel buildings, steel derricks, etc., have organized a new subsidiary to be known as Braden Steel Corporation to take over and expand the structural steel branch of business. Present company will continue to function as heretofore and plans extensions in its division.

Oklahoma Portland Cement Co., Perrine Building, Oklahoma City, Okla., has purchased tract of about 100 acres of land near Saratoga, Ark., and is said to be planning construction of new mill to cost more than $600,000, with equipment. M. O. Mathews is manager.

Board of Trustees, University of Arkansas, Fayetteville, is considering rebuilding of engineering laboratory and machine shop on campus, destroyed by fire, May 4, with loss reported in excess of $100,000, including equipment.

Viking Refrigerator Co., 7500 Independence Road, Kansas City, Mo., manufacturer of refrigerators, etc., has awarded general contract to Charles F. Woodling, 126 South Van Brunt Street, for a one-story addition, reported to cost more than $20,000, with equipment.

Board of Education, University City, Mo., is having plans completed for first unit of new senior high school, with manual training department, to cost approximately $450,000, for which bids will be received in near future. Ferrand & Fitch, 6188 Delmar Boulevard, St. Louis, are architects.

Talbot Mfg. Co., 1213 Chestnut Street, St. Louis, Albert R. Walker, head, recently formed by Mr. Walker and associates, is said to be planning operation of local plant for manufacture of electrical equipment and devices.

Phillips Petroleum Co., Bartlesville, Okla., has begun an expansion and improvement program at gasoline refining plants, reported to cost close to $450,000 with equipment. Work will include addition to Pampa plant in Texas Panhandle to develop a capacity of about 25,000 gal. per day; new plant in Hutchinson County, Tex., to be equipped for ultimate output of 20,000 gal. per day, to be known as Rock Creek plant; new plant at Sanford, Tex., now nearing completion, with capacity in excess of 18,000 gal. per day; and proposed new plant in Texroy district, Panhandle field, to be equipped for output of more than 15,000 gal. daily.

Board of Education, Stillwater, Okla., will soon break ground for proposed one-story manual training school, 100 x 100 ft., to cost more than $70,000, with equipment. Philip A. Wilbur, Architectural Department, Agricultural and Mechanical College, Stillwater, is architect.

Missouri Insulating & Refractories Corporation, St. Louis, has been formed by Frederick E. Kern, Syndicate Trust Building, and associates, to carry out proposed new mill on Clayton Road for manufacture of firebrick, insulating brick and other refractories, to cost more than $150,000, including equipment.

General Airplane Co., Wichita, Kan., M. L. Howe, president, is reported planning a new branch plant at Muskogee, Okla., to cost more than $25,000, with equipment.

Cleveland

CLEVELAND, May 14.

MACHINE tool business continues fair, although not quite up to the April volume. Orders with few exceptions are for single machines. April was the best month of the year with some of the local dealers, whose total volume of sales was helped materially by good orders from two or three companies equipping plants for making parts for Ford cars. Business from other companies that have taken Ford contracts has not materialized to the extent that was expected. Activity in the Detroit territory is rather slow. Turret lathes are moving well in single machine orders from scattered sources. The Cleveland Board of Education, which recently inquired for nine metal and woodworking machines for the Alexander Hamilton Junior High School, placed its orders during the week, dividing the business among several dealers. The Electric Auto-Lite Co., Toledo, purchased a few small machines. A price advance of from 7 to 10 per cent, and in a few cases as much as 15 per cent, was announced on woodworking machinery.

Erie City Iron Works, Erie, Pa., maker of powdered fuel equipment, steam boilers and engines, gray iron castings and fabricated steel, has established direct sales office at 1105 Leader Building, Cleveland, with Eugene Smith as district manager.

Ohio Power Shovel Co., Lima, Ohio, maker of gasoline shovels, has opened an office at 30 Church Street, New York, with L. H. Morris in charge; a Philadelphia office at 1119 South Fifty-sixth Street, in charge of E. E. Fort, and a Chicago office at 1250 Straus Building, with H. P. Steinbrenner in charge.

Contract has been let by Acme Auto Radiator Co., 7707 Carnegie Avenue, Cleveland, to A. H. Binns & Co., 7504 Carnegie Avenue, for one-story addition, 40 x 175 ft., to cost about $60,000 with equipment. T. C. Cerny, 4025 East Fifty-second Street, is architect. J. T. Bares is manager.

Solomon Auto Parts Co., Fostoria, Ohio, plans rebuilding of portion of works destroyed by fire, May 4, with loss reported in excess of $40,000 with equipment.

Toledo Central Garages, Inc., Produce Exchange Building, M. O. Baker, head, has plans nearing completion for six-story service, repair and garage building on Superior Street, near Monroe Street, to cost in excess of $250,000 with equipment. Mills, Rhines, Bellman & Nordhoff, Ohio Building, are architects.

B. F. Goodrich Co., Akron, Ohio, manufacturer of tires, mechanical rubber goods, etc., is arranging for increase in capital from 750,000 to 1,000,000 shares of stock, no par value, a portion of proceeds to be used for expansion. A new plant is being completed at Los Angeles, with rated capacity of 6000 tires and 7500 tubes per day. Plans are reported under consideration for rebuilding of plant at Tokio, Japan, to cost more than $500,000.

Gledhill & Kime Lumber Co., Cresline, Ohio, is planning installation of additional machinery at its mill, including motor-driven saws, combination wood-working machine, and other tools.

Spicer Mfg. Corporation, South Plainfield, N. J., manufacturer of universal joints, axles, etc., has completed construction of branch plant at Toledo, Ohio, and will develop capacity to increase present gross output at all plants about 50 per cent. New plant will be operated under name of Dana Mfg. Co., and represents investment of close to $500,000. Charles A. Dana is president.

J. E. Orford, Jefferson, Ohio, has awarded general contract to Lakeshore Construction Co., Ashtabula, Ohio, for a one-story automobile service, repair and garage building on Chestnut Street, to cost close to $65,000, with equipment.

Gulf States

BIRMINGHAM, May 15.

PLANS are being arranged by Gonzales Cement Works, Gonzales, Tex., for removal of mill to San Antonio, Tex., where consolidation will be carried out with another plant at that place. Proposed to increase capacity with installation of additional equipment.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in proposed two-story addition to be erected by Malbis Baking Co., 871 Broad Street, Mobile, Ala., 100 x 160 ft., to cost about $70,000, with equipment.

Marianna Lime Products Co., Marianna, Fla., has acquired limestone properties of Lime Products Co., White Cliffs, Little River County, Ark., and plans early construction of new plant for manufacture of lime products, reported to cost more than $90,000, with machinery. A. M. Lewis heads first-noted company.

Humble Pipe Line Co., operated by Humble Oil & Refining Co., Houston, Tex., will build two docks at Aransas Pass, Tex., with elevating, conveying and other handling equipment, estimated to cost $200,000.

Central Power & Light Co., San Antonio, Tex., has acquired Nixon Electric Light & Power Co., Nixon, Tex., and will operate as subsidiary. Plans are under way for extensions in Nixon district, including installation of transmission lines.

Herman Rosch, city clerk, El Paso, Tex., is asking bids until May 24, for buildings for municipal airport, including hangar with repair facilities, lighting system for landing field, etc.

Golden West Oil Co., National Bank of Commerce Building, San Antonio, Tex., is planning construction of new refining plant in Medina County for lubricating and other refined oils, reported to cost more than $85,000, with equipment.

Belchie & Laskey, Inc., Slattery Building, Shreveport, La., has surveys under way for a new 16 and 20-in. pipe line from Richmond to Lafayette, La., for natural gas transmission, reported to cost more than $100,000.

Chevrolet Motor Co., Laredo, Tex., local representative for Chevrolet automobile, will soon begin work on one-story service, repair and garage addition, 55 x 110 ft., reported to cost in excess of $80,000, with equipment. Guy M. Trout, Ramos Building, is architect.

Board of Water Commissioners, Dallas, Tex., will soon take bids for equipment for large central pumping plant in connection with $4,000,000 expansion and improvement program for municipal waterworks. Fuller & McClintock, 170 Broadway, New York, are consulting engineers. S. E. Moss is head of board.

City Council, Vernon, Tex., has approved plans for a one-story municipal electric light and power plant, reported to cost about $30,000, with equipment. A traveling crane will be installed. R. H. Stuckey, Vernon, is architect.

Board of Education, Big Spring, Tex., is said to be planning installation of manual training equipment in proposed three-story high school addition, reported to cost in excess of $175,000. Trost & Trost, Two Republics Building, El Paso, Tex., are architects.

American Potash Co., Dallas, Tex., care of T. G. Leachman, 3725 Stratford Avenue, recently organized, has taken title to potash properties in vicinity of Odessa, Tex., and plans early installation of complete mining plant. A refining plant for daily capacity of about 2000 tons will be installed. Entire project is reported to cost more than $500,000. Max Agress has been elected president.

Tritex Oil Co., Gunter Building, San Antonio, Tex., is planning construction of pipe line, about 15 miles long, to Uvalde, Tex., and vicinity, for natural gas supply, reported to cost approximately $50,000, with equipment.

Linde Air Products Co., 30 East Forty-second Street, New York, a subsidiary of Union Carbide & Carbon Corporation, same address, will soon begin work on first unit of new industrial oxygen plant at Shreveport, La., to cost about $45,000, with equipment. Other units will be built at later date.

Duval-Texas Sulphur Co., Second National Bank Building, Houston, Tex., J. W. Cain, president, plans installation of mining plant on sulphur properties in vicinity of San Diego, Duval County, to cost more than $80,000, with machinery. Company has arranged with Houston Gulf Gas Co. for construction of pipe line to plant site for fuel supply.

Stilwell Benzol Refining Co., Port Arthur, Tex., A. E. Stilwell, head, is reported planning a new refining plant on local site, with rated output of about 800 bbl. per day, to cost approximately $300,000, with machinery.

City Council, Laredo, Tex., has acquired a tract of about 400 acres of land for municipal airport and plans early construction of hangars, repair shop, oil storage and distributing building, and other mechanical structures.

Philadelphia

PHILADELPHIA, May 15.

PLANS have been filed by Pennsylvania Railroad Co., Philadelphia, for eight-story cold storage and refrigerating plant on Oregon Avenue, near Delaware Avenue, with one-story unit adjoining for power service, etc., to cost close to $1,100,000, for which erection contract has been let to United Engineers & Constructors, Inc., 125 East Forty-sixth Street, New York. Day & Zimmermann, Inc., Sixteenth and Walnut Streets, is engineer.

Welsbach Street Lighting Co. of America, Twentieth and Arch Streets, Philadelphia, manufacturer and operator of highway gas-lighting equipment, has leased two-story factory, 60 x 275 ft., to be erected at Westmoreland and Stokley Streets, reported to cost in excess of $75,000, for a new plant. E. A. Stopper, 10 South Eighteenth Street, is architect.

Union Dental Instrument Mfg. Co., 831 Cherry Street, Philadelphia, has purchased property at 700-2 North Franklin Street, and will have plans drawn for a new plant, totaling about 20,000 sq. ft. floor space.

American Brown-Boveri Corporation, 420 Lexington Avenue, New York, operating former plant of New York Shipbuilding Co., Camden, N. J., has taken an option on purchase of part of shipbuilding plant of William Cramp & Sons Ship & Engine Building Co., Richmond and Norris Streets, Philadelphia, where operations recently were discontinued, and purposes to use for new shipbuilding unit; majority of light machinery and portable equipment at plant has been sold, and will be replaced by purchasing company.

Crown Smelting Co., Chester, Pa., plans to devote a considerable part of production in future to manganese bronze propellers, and has secured a contract from Government for 20 naval propellers for scout cruiser service, totaling about $75,000.

Sentry Safety Control Co., Thirteenth and Cherry Streets, Philadelphia, manufacturer of safety devices and equipment for motion picture booths, etc., has leased additional space in building at location noted to double present quarters and will increase capacity. Joseph E. Cohen is president.

Barbour Brothers, Trenton, N. J., operating an iron and steel works at Marion Street and line of Reading Railroad, are having plans drawn for a one-story shop addition, 76 x 150 ft. Walter Hankin, 224 East Hanover Street, is architect.

Board of Education, Pleasantville, N. J., plans installation of manual training equipment in new three-story high school, reported to cost more than $200,000, for which bids will be asked in about a month. S. Hudson Vaughn, Guarantee Trust Building, Atlantic City, N. J., is architect.

Board of Trustees, Lafayette College, Easton, Pa., is having plans prepared for a three-story engineering building, to cost about $500,000 with equipment. C. Z. Klauder, 1429 Walnut Street, Philadelphia, is architect. Dr. Mathew Lewis is president.

James K. Peck, 1013 Olive Street, Scranton, Pa., and associates have organized Scranton Auto Body Co., to operate a local body-building and repair plant. H. E. Thomas, Scranton, is also interested in company.

Pusey & Jones Corporation, Wilmington, Del., has begun an expansion and improvement program in paper-making machinery division of plant, to include new forge shop and two-story woodworking plant, with installation of additional

equipment in machine shop and foundry. Entire expansion will cost about $350,000.

New York & Pennsylvania Co., Lock Haven, Pa., is reported planning a new building at its paper mill to cost in excess of $200,000 with equipment. Headquarters are at 200 Fifth Avenue, New York.

Reading Co., Reading Terminal, Philadelphia, has work under way on extension and improvement program at engine terminal and shops at Sunbury, Pa., to include installation of additional equipment, estimated to cost about $100,000. Program will also provide facilities for handling repair and reconditioning of locomotives of Pennsylvania Railroad, which will abandon its present engine terminal at that place.

South Atlantic States

BALTIMORE, May 15.

CONTRACT has been let by C. Hoffberger & Co., 538 East Monument Street, Baltimore, operating ice-manufacturing and cold storage plants, to M. A. Long Co., 10 West Chase Street, for an eleven-story and basement cold storage and refrigerating plant, 115 x 140 ft., to cost $1,000,000 with machinery. It will provide 1,330,000 cu. ft. of space. John H. Wickersham, Lancaster, Pa., is engineer.

Board of Education, Baltimore, plans installation of manual training equipment in proposed four-story junior high school on site selected on Barrington Road, near Garrison Boulevard, reported to cost $1,000,000, for which architect will soon be appointed. H. J. Leimbach, Municipal Office Building, is chief engineer, Public Improvement Commission, in charge.

Annapolis & Chesapeake Bay Power Co., Annapolis, Md., operated by Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has secured permission to acquire Herald Harbor Power Co. and Severna Electric Co., Anne Arundel County, and will consolidate with system. Plans under consideration for expansion in acquired properties, including transmission line construction.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until June 13, for 12,138 lineal ft. wire fencing for naval petroleum reserve No. 3, Natrona, Wyo., 7 ft. high, non-climbable type with link chain, diamond mesh wire fabric, extension arms, etc., specification 5610. Also, for salt water pumping plant for naval operating base, San Diego, Cal., no closing date stated, specification 5478.

General Public Service Corporation, Citizens Bank Building, Baltimore, Clarence B. Love, secretary, recently organized, has plans for a one-story plant, 75 x 125 ft., for manufacture of fertilizer products, to cost close to $40,000 with equipment. Howard Borden, Catonsville, Baltimore, is architect.

Toland & Son, 232 North Front Street, Baltimore, manufacturer of saws, tools, etc., plan early rebuilding of portion of plant recently destroyed by fire with loss estimated at close to $25,000 including equipment.

Chevrolet Motor Car Co., Flint, Mich., has completed initial units of new assembling plant at Atlanta, Ga., and will place in service at once. It is proposed to develop a production schedule of 6000 cars per month.

Board of Crisp County Power Commissioners, Cordele, Ga., is asking bids until July 10, for a hydroelectric power project on Flint River, to be operated as county property and for which appropriation of $1,250,000 has been approved. Project will include power dam; one-story power house, 40 x 150 ft.; two 3600-hp. vertical waterwheels, with generators and complete accessories. At later date, bids will be asked for additional generating equipment to develop gross output of 14,000 hp.; also, for transmission lines, etc. Emmett S. Killibrew, Albany, Ga., is engineer; J. E. Sirrine & Co., Greenville, S. C., are consulting engineers.

Yancey Brothers, 550 Whitehall Street, Atlanta, Ga., manufacturers of road-building machinery, are planning rebuilding of portion of machine shop destroyed by fire, May 4, with loss reported in excess of $20,000; storage and distributing building was also destroyed in same fire.

Roanoke Gas Light Co., Roanoke, Va., is planning extensions and improvements in plant and system, including construction of lines to Salem, Va., and vicinity, installation of air compressors and other equipment. W. J. McCorkingdale is manager and engineer.

American Creosoting Works, Inc., Bank of Commerce Building, Norfolk, Va., has plans completed for a new plant for distillation of creosote from coal tar, to be equipped for initial output of about 350,000 gal. per month, reported to cost in excess of $450,000 with machinery.

City Council, Kings Mountain, N. C., is asking bids until May 29 for a complete water purification plant for municipal waterworks, with capacity of 1,000,000 gal. Carolina Engineering Co., Johnston Building, Charlotte, N. C., is engineer.

Procter & Gamble Co., Sixth and Main Streets, Cincinnati, has awarded a general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for new soap manufacturing plant at Baltimore, where 8-acre tract of land recently was acquired in Locust Point district. Will consist of several units, with power house, machine shop and other mechanical buildings, reported to cost $4,000,000 with machinery.

Southern Factories & Stores Corporation, Richmond, Va., care of Rives Fleming, 3609 Hawthorne Avenue, recently formed with capital of $1,000,000, is said to be concluding arrangements for purchase of Cameron Stove Co., 2100 Decatur Street, and intends carrying out expansion program.

Bristol Gas & Electric Co., Bristol, Va.-Tenn., will carry out expansion and improvement program to cost about $500,000, including expansion in power facilities, installation of automatic power substations and transmission line construction. Company is under direction of Henry L. Doherty & Co., 60 Wall Street, New York.

Fruit Growers' Express Co., Munsey Building, Washington, W. D. Martin, chief engineer, is reported planning a new one-story ice-manufacturing plant at Aberdeen, N. C., 50 x 180 ft., with cold storage and refrigerating division, reported to cost more than $200,000 with machinery.

Chemical Warfare Service, Edgewood Arsenal, Md., will receive bids until May 22 for valves, traps, plugs, tees, unions, copper floats and kindred supplies, circular 101; for bolts, nuts, screws, clamps, gage glasses, oil cups, etc., circular 102; and for electric equipment, including compensators, switches, fuses, 30,000 ft. rubber-covered wire, etc., circular 103.

Detroit

DETROIT, May 15.

GENERAL contract has been let by White Co., Seventy-ninth Street and St. Clair Avenue, Cleveland, manufacturer of motor trucks, to Corrick Brothers, Owen Building, Detroit, for one-story factory branch, with service and repair departments, on Twelfth Street, Detroit, to cost $150,000 with equipment. Hadlow, Hughes, Hicks & Conrad, Union Mortgage Building, Cleveland, are architects.

National Gas & Electric Co., Battle Creek, Mich., will make extensions and improvements in gas plant at Grand Haven, Mich., including installation of two 217-hp. boiler units and accessories, to cost about $35,000.

Machinery and equipment at plant of Wills-St. Claire Co., Marysville, Mich., manufacturer of automobiles, inactive since November last, has been sold to A. Shiffman and Theodore Friedeberg, 30 Church Street, New York, machinery dealers, who will dismantle the plant and dispose of tools and equipment at private sale. The plant originally carried a valuation of $2,000,000.

Monroe Auto Equipment, Monroe, Mich., manufacturer of tire pumps, automobile heaters, etc., has awarded general contract to Gettins & Kopitke Co., Fifteenth Street, Toledo, Ohio, for one-story addition, 55 x 175 ft., to cost in excess of $75,000 with equipment. Other expansion will be carried out at early date to cost approximately double this sum. C. O. Miniger, president, Electric Auto-Lite Co., Toledo, has acquired an interest in company and will become actively identified with management.

Chrysler Motor Corporation, Highland Park, Detroit, has plans in progress for a one-story power house, reported to cost in excess of $75,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are engineers. Company will proceed with immediate erection of new one-story unit for nickel-plating service, to cost close to $60,000 with equipment.

Officials of Roamer Motor Car Co., Kalamazoo, Mich., manufacturer of automobiles, have formed a new company under Delaware laws to be known as Roamer Consolidated Corporation, capitalized at $2,500,000, to take over and expand present company. Several companies in kindred field will be acquired by new organization and merger carried out. A. C. Barley, head of present concern, will act in same capacity with new corporation.

Wilson Foundry & Machine Co., Pontiac, Mich., affiliated with Willys-Overland Co., Toledo, Ohio, is carrying out an expansion program for increase in manufacture of six-cylinder motors for Whippet automobiles, to cost more than $500,000, the bulk of fund being used for new machinery and equipment. Working force has been increased by more than 500 men, making a total of more than 4300 operatives at plant, highest in history of company.

Wisconsin-Michigan Power Co., Iron River, Mich., will make extensions in transmission lines from Iron River to Phelps and vicinity, reported to cost close to $24,000.

Bohn Aluminum & Brass Co., 2512 East Grand Boulevard, Detroit, is said to have plans under way for an addition to plant devoted to production of aluminum pistons for aircraft motors, to increase present capacity by about 50 per cent. Company has recently secured large contracts for pistons for Whippet cars and other automobiles.

Michigan Transit Co., 6649 Dix Street, Detroit, has acquired a tract of waterfront property at Ecorse, Mich., totaling about 18 acres, and plans to use portion of site for a new dock, 1000 ft. long, to be equipped with elevating, conveying and other mechanical-handling equipment.

Contract for construction work on new dryer building for Postum Co., Battle Creek, Mich., has been let to H. G. Christman-Lansing Co., Lansing, Mich., and work will begin immediately with view to completion July 1. Lockwood, Greene & Co., Inc., Chicago, is engineer.

Hutchins Car Roofing Co., Detroit, has removed its office from 1203 Ford Building to 2310 Eaton Tower, Woodward Avenue at Grand Circus Park.

Durant Motors, Inc., Lansing, Mich., has awarded a general contract for a plant addition to H. G. Christman & Co.

Milwaukee

MILWAUKEE, May 14.

WHILE but slight gains are being made in the volume of machine-tool business, considerable satisfaction is expressed in some quarters over the fact that trade is well maintained. The lull in automotive buying is expected to be relieved, there having been a renewal of inquiry. Usually, however, requests for prices and deliveries cover but one or two machines. Several important industrial projects are developing in Milwaukee which will require considerable equipment. Moderate activity is reported in the used machinery market.

L. J. Mueller Furnace Co., 197 Reed Street, Milwaukee, a pioneer manufacturer of hot air and vapor heating furnaces, is preparing to engage extensively in the production of gas heating units for domestic, institutional and industrial heating. A bond issue of $500,000 has been underwritten by the Mississippi Valley Trust Co., St. Louis, the proceeds to be applied to the acquisition of new machinery, additions to the sales force, and advertising. No plant extensions are contemplated at this time. L. J. Mueller, Jr., is president and treasurer.

Appleton Machine Co., 618 South Oneida Street, Appleton, Wis., has engaged W. F. Dolke, consulting engineer, 1841 Asbury Avenue, Evanston, Ill., to design a new foundry building of brick and steel construction, estimated to cost $75,000. Preliminary plans will be ready about May 25. F. E. Saecker is president.

E. I. DuPont De Nemours Co., Tenth and Market Streets, Wilmington, Del., expect to begin June 1 on new and reconstruction work costing about $425,000, to provide a complete ammonia oxidization plant at its works at Barksdale, near Washburn, in Bayfield County, Wis. R. T. Cann is general superintendent.

Board of Education, Racine, Wis., is closing bids May 23 for furnishing shop tools, electric shop equipment, motors, auto mechanics equipment, printing shop equipment and mechanical drawing equipment for the vocational training departments of the new Washington Park and the William Horlick High Schools. Each school will cost about $750,000. The architects are Croft & Boerner, 1004 Marquette Avenue, Minneapolis, Minn., and J. Mandor Matson, Racine.

U. S. Property and Disbursing Officer for State of Wisconsin, Camp Douglas, Wis., closes bids June 2, separately on a 150-ft. 10-in. bore deep well; 100-ft. steel tower and 50,000 gal. steel tank; about 8000 lineal ft. of cast iron pipe; two 200-gal. pumps; hydrants, valves, fittings, for a central water system on the State military reservation. Maj. H. C. Engels, 445 Milwaukee Street, Milwaukee, is State military architect and engineer. The work will cost about $80,000.

Metal Forms Corporation, 1440 Booth Street, Milwaukee, making metal forms for concrete construction, will build a one-story factory extension, 21 x 64 ft. Roy M. Moss is secretary and manager.

Milwaukee Electric Railway & Light Co., 217 Michigan Street, Milwaukee, was granted a franchise May 7 for the construction of a $4,000,000 subway and rapid transit line, 2.8 miles long, with a tunnel of about ½ mile, from the terminal at Second and Michigan Streets to Eighth Street and St. Paul Avenue. All grade crossings will be eliminated by two stretches of elevated line, one 500 ft. and the other 1100 ft. long. E. J. Archambault is engineer in charge.

Maynard Electric Steel Casting Co., Milwaukee, has plans by Frank S. Gurda, architect, 448 Mitchell Street, for a two-story pattern storage building, 60 x 108 ft., at Twenty-second Avenue and Kilbourn Road. It will cost about $30,000. Frank J. Wabisczewski is secretary and general manager.

Milwaukee Works, International Harvester Co. of America, 784 Park Street, Milwaukee, which has started work on a new boiler room building, 65 x 140 ft., 75 ft. high, costing $500,000, also will build a factory addition to be known as building No. 33, estimated to cost $350,000. Both projects are in charge of the Worden-Allen Co. Plans for the factory, to be four stories, will be ready about June 15. Paul F. Schryer is general superintendent.

Thinker Motor Co., 84 Farwell Avenue, Milwaukee, distributer of Pierce-Arrow motor cars and trucks, will build a one-story fireproof sales and maintenance building, 120 x 150 ft., at 365-371 Kenilworth Place, at a cost of about $50,000 complete. The general contractor is H. Schmitt & Sons, Inc., 14 Burleigh Street, local.

Drott Tractor Co., 123 Wisconsin Avenue, Milwaukee, closes bids May 17 on the erection of a new office-service building, 90 x 130 ft., three stories, on Wisconsin Avenue, near Thirty-seventh Street. It will cost about $80,000. The concern is distributer of Caterpillar tractors and equipment. E. A. Drott is president and general manager.

Chicago

CHICAGO, May 14.

THE Chicago machine tool market holds steady from the viewpoint of sales. Inquiry, both old and new, from miscellaneous industries bulks large. The railroads are showing very little interest in the market, the only new inquiry this week being for a die grinder by the Chicago, Burlington & Quincy. Although the Santa Fe placed a few items several weeks ago, additional purchases against its list apparently have been deferred. The Board of Education, Chicago, is asking for a No. 80 C. Oliver saw, a tool room grinder and a 15-in. x 6 ft. engine lathe for the Sheldon Continuation School.

Julius Schultz and Maurice Cohn, Waterloo, Iowa, have formed a partnership to purchase equipment and stock of Waller Mfg. Co., Waterloo, and have occupied company plant at Westfield Avenue and Lamson Street, where manufacture of auto heaters will be continued.

Waterloo Register Co., Waterloo, Iowa, manufacturer of warm air registers and cast iron smoke pipe for furnaces, has sold its present factory at 110 Rath Street to Rath Packing Co. and has purchased plant of Interstate Tractor Co., 2520 Fourth Street, which register company will occupy July 1. New plant consists of two factory buildings, foundry and office building. John C. Knox is president.

University of Chicago will build a power plant to cost $1,500,000.

Madison Silo Co., Madison, Wis., has purchased two and one-half acres on which it will erect a modern factory building.

Evans-Miller Co., Adrian, Mich., manufacturer of battery separators, has practically completed the installation of equipment and is now on a production basis.

George J. Meyer Mfg. Co., Milwaukee, manufacturer of bottle washing machinery, has acquired the Cudahy, Wis., plant of the Worthington Pump & Machinery Co. The Cudahy property will provide facilities that will enable the company to more than double its production.

Lyons Metal Products, Inc., is the name of the new company formed as the result of the consolidation of the Lyons Metallic Mfg. Co., Aurora, Ill., and the Durand Steel Locker Co., Chicago Heights, Ill., manufacturers of steel lockers, cabinets and other steel products. New company will have assets of about $3,375,000. F. S. Waters is president and Keith Spalding vice-president.

Negotiations have been closed for a $15,000,000 merger of the Borg & Beck Co., Chicago, the Warner Gear Co., Muncie, Ind.; the Marvel Carburetor Co., Flint, Mich., and the Mechanics Machine Co., Rockford, Ill. The new company will be known as the Borg-Warner Corporation. It will have $5,000,000 of 7 per cent preferred stock of which $3,500,000 will be issued, and 500,000 shares of no par common stock, of which 410,000 shares will be issued.

City Council, Evanston, Ill., contemplates installation of municipal electric light and power plant, reported to cost in excess of $60,000 with equipment. R. Long, City Hall, is city engineer.

Bassick Mfg. Co., 2650 North Crawford Avenue, Chicago, manufacturer of lubricating equipment for automobile service, an interest of Stewart Warner Speedometer Corporation, 1828 Diversey Parkway, has filed plans for a three-story addition, 80 x 120 ft., reported to cost about $175,000 with equipment.

Bliss & McLaughlin, Inc., Harvey, Ill., manufacturer of shafting, cold finished bar stocks, etc., has purchased former plant of Hotchkiss, Blue & Co., Harvey, manufacturer of railroad car equipment, and adjoining site, totaling about five acres in all, and will occupy for expansion. Present buildings will be remodeled and improved.

Empire Zinc Co., Belden, Colo., is considering erection of new milling plant at its Eagle mine, estimated to cost $200,000 with equipment.

National Wire Cloth & Iron Co., St. Paul, Minn., recently organized, will operate a plant at 260 West Fairfield Avenue, for manufacture of wire window guards, coal screens and kindred products.

Signal Corps, Procurement District, Chicago, will receive bids until May 22, for magnet wire, hand generator, 1000 washers, induction coils, cranks, etc., circular 99.

Western Public Service Co., Colorado Springs, Colo., has approved plans for a new steam-operated electric power plant at Laramie, Wyo., reported to cost about $80,000 with equipment.

Cellucraft Co., 1709 West Austin Avenue, Chicago, manufacturer of ventilators for automobiles, celluloid products, etc., has begun work on a new addition, 25 x 100 ft., on adjoining site, for which general contract recently was let to G. Kehl & Sons, 1225 North Maplewood Avenue.

Board of Education, Decatur, Ill., is said to be planning installation of manual training department in new three-story junior high school on John's Hill, estimated to cost $300,000. Brooks, Bramhill & Dague, National Bank Building, are architects.

Wyoming Carbonizing & Briquetting Co., Kemmerer, Wyo., C. D. Stafford, president, has plans under way for a new coal briquette manufacturing plant at Conroy, near Kemmerer, with capacity of about 150 tons per day, reported to cost close to $150,000, with machinery.

Kelly Mfg. Co., 131 South Fifth Street, Clinton, Iowa, manufacturer of furniture, will soon take bids for a new three-story plant on Eighth Avenue, near Third Street, to cost about $65,000. A. M. Morrell, Weston Building, is architect.

Buffalo

BUFFALO, May 15.

PLANS are being arranged for a merger of United States Light & Heat Corporation, Niagara Falls, N. Y., manufacturer of electric storage batteries, car lighting equipment, etc., and Electric Auto-Lite Co., Toledo, Ohio, manufacturer of automobile starting and lighting equipment. It is proposed to continue both plants in service, as well as present branch factories, with expansion program for increased output. Last-noted company plans to increase capital from 250,000 to 1,000,000 shares of stock, no par value, and to dispose of preferred stock to an amount of about $10,000,000, portion of fund to be used for development program. C. O. Miniger is president of Electric Auto-Lite Co.

A. J. Grad, Buffalo, operating an automobile body plant at 718 Broadway, has organized a new company under name of A. J. Grad Sons' Body Corporation, capitalized at $35,000, to take over and expand present works, including additional facilities for body manufacture. New company is headed by Anthony J. and Frank A. Grad.

Yingling-Martin Brick Co., Johnsonburg, Pa., is carrying out an expansion and improvement program, including installation of conveying and other mechanical handling equipment, buckets, etc. William H. Signor is superintendent.

Following recent acquisition of chain block, electric hoist and crane division of Chisholm & Moore Mfg. Co., Lakeside Avenue, Cleveland, by Columbus-McKinnon Chain Co., Tonawanda, N. Y., officials of last-noted company have formed a new subsidiary under name of Chisholm-Moore Hoist Corporation, with capital of $200,000, and 14,000 shares common stock, no par value, to take over and expand the purchased division. The plant will be continued in Cleveland, as heretofore. Another company has been formed, independently, under name of Chisholm-Moore Malleable Iron Co., to take over and continue production of foundry branch of company.

Spencer Kellogg & Sons, Inc., Niagara Square, Buffalo, operating crushing mills and refining plants for vegetable oil production at Buffalo, Edgewater, N. J., Minneapolis, Minn., and Superior, Wis., is disposing of a stock issue to total $2,041,000, a portion of proceeds to be used for expansion and improvements. Howard Kellogg is president.

Frederick W. Cheshire, 1718 James Street, Syracuse, N. Y., and associates have formed a new company to be known as F. W. Cheshire, Inc., to operate a local plant for manufacture of heating and cooking appliances.

Board of Education, Cooperstown, N. Y., contemplates installation of manual training equipment in new two-story addition to high school on Main Street, to cost about $175,000, for which it is expected to ask bids on general contract during summer. Kinne & Frank, 7 Hopper Street, Utica, N. Y., are architects.

Fairchild Amusement Machine Corporation, 404 S. A. & K. Building, Syracuse, N. Y., has been organized to manufacture automatic amusement machines and parts. At present equipment is manufactured by contract and company is not in market for materials. After Aug. 1 bids will be taken on certain types of equipment.

Morrison Railway Supply Corporation, Buffalo, has purchased railroad track material business formerly conducted by Morrison & Risman Co., Inc. Former company operated plants and warehouses at Chicago, Indianapolis, Pittsburgh and Harrisburg, Pa., and Buffalo and engaged in reconditioning of rails and of railroad track material.

Pittsburgh

PITTSBURGH, May 14.

OCCASIONAL single tool orders and fairly steady buying of repair parts are the dependence of machine tool dealers in this area. New inquiries are few. The Miller Saw Trimmer Co., which is to build a new plant for the manufacture of printers' machinery, is planning to move all of its present equipment to the new plant and it is reported will not have to have many new machines. Crane companies have a rather imposing pending list, but no orders of importance were closed in the past week.

The Miller Saw Trimmer Co., Point Building, Pittsburgh, builders of printers' machinery will build a new plant at Reedsdale and Walker Streets, North Side, Pittsburgh, at an estimated cost of $200,000. F. F. Nicola is president.

Contract has been let by Mine Safety Appliance Co., Braddock Avenue, Pittsburgh, to Taylor-Meyer Co., Keystone Building, for two new additions to plant, used for production of safety equipment for coal-mining service, each one and four-story and basement, 80 x 100 ft., to cost approximately $200,000 with machinery.

Dicks Aeronautical Corporation, Pittsburgh, care of George H. Lee, 451 Orchard Avenue, Bellevue, Pa., recently formed by Mr. Lee and associates, plans operation of local plant for assembling of aircraft and manufacture of airplane parts. James H. Reniers, 6609 Church Street, Ben Avon, Pa., is also interested in company.

Allied Power & Light Co., recently organized by officials of Stevens & Wood, Inc., 120 Broadway, New York, engineer, and other interests, will take over controlling interest in Penn-Ohio Power Co., Sharon, Pa.; Northern Ohio Power Co., and other utility properties in this section. New company is capitalized with 500,000 shares of preferred stock, and 2,000,000 shares of common stock. A bond issue will soon be sold, portion of proceeds to be used for expansion, including transmission line construction. R. P. Stevens is president.

Consolidated Gas Co., 821 Sixth Avenue, Huntington, W. Va., George I. Neal, president, is planning construction of 12-in. pipe line for natural gas service. A franchise has been secured.

John Miller, 575 Oxford Street, Pittsburgh, and associates have organized Lonsdale Brass Works, Inc., with capital of $50,000, to operate a local plant for production of brass pipe, couplings, etc. It is understood that new company will succeed to and expand Lonsdale East End Brass Works, with plant at 5708 Harvard Street. James H. Lonsdale, 5456 Kincaid Street, will be one of heads of new organization.

Erie Forge Co., Sixteenth and Cascade Streets, Erie, Pa., plans rebuilding of portion of pattern department destroyed by fire, May 7.

Indiana

INDIANAPOLIS, May 15.

BIDS will be asked early in June by Board of Education, Muncie, Ind., for one-story vocational training school on North Walnut Street, to cost about $150,000 with equipment. Houck & Smenner, 108 East Washington Street, are architects.

Rub-Tex Products Co., Indianapolis, has been organized to take over and expand plant and business of Rub-Tex Products, Inc., 3500 East Twentieth Street, manufacturer of rubber battery boxes and kindred products. Last-noted company has recently been in financial difficulty and property has been purchased at receivership sale by heads of new concern for $222,000. An expansion program will be carried out, with facilities for larger production. Edwin H. Emrich, formerly president, will continue with new organization in executive capacity. Fred G. White heads company.

Dean Forging Co., Muncie, Ind., manufacturer of drop forgings for automotive service, plans rebuilding of machine shop and other portions of plant destroyed by fire, May 5, with loss reported at close to $50,000 including equipment. Wilbur A. Full is manager.

Servel Corporation, Morgan Avenue and Illinois Street, Evansville, Ind., manufacturer of electric and gas-operated

refrigerating equipment, has awarded general contract to M. J. Hoffman Construction Co., Furniture Building, for one-story addition, 65 x 130 ft., reported to cost about $30,000 with equipment.

J. Everett Jones, 936 West Eighth Street, Anderson, Ind., and associates have awarded general contract to James I. Barnes, Anderson, for new two-story and basement automobile service, repair and garage building, 85 x 124 ft., at Broadway and Third Streets, Logansport, Ind., reported to cost about $100,000 with equipment. E. F. Miller, Farmers' Trust Building, Anderson, is architect.

Receiver for Steinbrenner Rubber Co., Noblesville, Ind., is planning for early sale of plant and property of company, which is appraised at $275,000, including real estate and machinery.

Electric Shovel Coal Corporation, Clinton, Ind., operating coal mining properties under electric shovel stripping method, is disposing of a preferred stock issue to total about $2,900,000, a portion of proceeds to be used for expansion in property holdings and operations in Clay and Vermilion Counties. J. B. F. Melville is president.

Southeastern Indiana Power Co., Indianapolis, has made application for permission to acquire transmission lines and other property of Suburban Light & Power Co., in Fayette, Union, Johnson and Shelby Counties; and Eastern Light & Power Co., in Marion and Johnson Counties. New owner will consolidate with organization, and plans expansion in acquired territory, including transmission line construction.

Cincinnati

CINCINNATI, May 14.

MACHINE tool orders declined somewhat the past week with the result that sales in the first half of May were from 10 to 15 per cent less than the average of April. Important builders do not attach any special significance to the letdown in buying, attributing it to seasonal conditions. Few large inquiries are before the local trade, although the total volume of pending business is considered fairly good. Recent bookings have been well distributed among manufacturers in many industries, automobile companies having been a comparatively small factor in the market. The Union Pacific has closed for a 6-ft. Right Line radial drill.

The Metal Aircraft Corporation, Cincinnati, has been incorporated for $500,000 to manufacture an all-metal airplane. A factory will be constructed near Lunken Airport. Incorporators include T. Higbee Embry, John B. Hollister and E. F. Lunken.

The Chevrolet Aircraft Corporation, Indianapolis, has been incorporated to manufacture and sell airplanes and airplane motors. Plans will not be completed for several months and the type of motor to be manufactured has not been decided upon. Louis and Charles Chevrolet are the incorporators. The former is now associated with the Chevrolet Brothers' Mfg. Co., 410 West Tenth Street, Indianapolis.

The Howser Tool Mfg. Co. has moved its plant from LaPorte, Ind., to Nineteenth and Martindale Streets, Indianapolis, and is now in production at the latter location.

Arrangements have been completed by Mal-Gra Casting Co., Cambridge City, Ind., for purchase of plant and business of Mid-West Casting Co., Middletown, Ohio, and companies will be consolidated. Purchasing company will remodel and extend Middletown plant and proposes to remove present Cambridge City works here, concentrating production at one plant. Harry Bachman is one of heads of Mal-Gra company.

Kodel Radio Corporation, Cincinnati, has arranged for increase in capital from 62,500 to 100,000 shares of stock, no par value, a portion of proceeds to be used for expansion. Company has also arranged for change of name to Kodel Electric & Mfg. Co., and will increase lines of output.

Basic Products Co., Peebles, near Portsmouth, Ohio, is considering rebuilding of portion of stone-crushing plant, destroyed by fire, May 7, with loss reported at close to $90,000, with equipment.

Tennessee Eastern Power Co., Johnson City, Tenn., has made application for permission to construct and operate a hydroelectric generating plant on Holston River, Sullivan and Washington Counties, with initial capacity of 48,000 hp., reported to cost close to $5,000,000, with power dam and transmission lines. Company is operated by Henry L. Doherty & Co., 60 Wall Street, New York.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in proposed new baking plant to be erected by Linker Brothers, 1125-27 Market Street, Louisville, on adjoining site, reported to cost close to $100,000, with equipment. Harry Linker is head.

Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of cast iron and other sanitary ware, has plans for a two-story and basement factory branch and distributing plant, 100 x 100 ft., at Seventeenth and Church Streets, Nashville, Tenn., reported to cost close to $100,000, with equipment. Marr & Holman, Stahlman Building, Nashville, are architects.

General Electrical Supply Corporation, Memphis, Tenn., has completed negotiations for purchase of plant and business of Southeastern Electric Co., 429-31 Broad Street, Chattanooga, Tenn., with branch at 312 West Jackson Avenue, Knoxville, Tenn., and will consolidate with organization. Expansion is planned. George R. Hernstein is president of purchasing company.

Air Corps, Material Division, Wright Field, Dayton, Ohio, is asking bids until May 21, for 192 keyseat cutters, 192 pairs of jaws, steel rules, tinners' snips, open end wrenches, etc., circular 329. Until May 24, for 50 engine overhaul tilting stands, circular 292.

Southern Cities Utilities Co., operating Southern Cities Power Co., Provident Building, Chattanooga, Tenn.; Wheeling Public Service Co., Wheeling, W. Va.; Durham Gas Co., Durham, N. C.; Carolina Coach Co., and other electric light and power properties, is disposing of a bond issue of $10,500,000, a portion of proceeds to be used for expansion and betterments, including transmission line construction. Walter Whetstone is president.

Ashland By-Products Coke Co., Ashland, Ky., has made application for permission to construct coal and coke loading terminal at plant of Semet Solvay Co., near Dam 29, Ohio River, including mechanical conveying and handling equipment.

Cincinnati Gas & Electric Co., Cincinnati, recently organized, has secured permission to take over and consolidate local company of same name, Columbia Power Co., and Union Gas & Electric Co., all operating in this district, with combined assets totaling $92,580,000. New company plans expansion program, including transmission line construction.

Pacific Coast

SAN FRANCISCO, May 10.

IN connection with expansion program, Southern California Edison Co., Los Angeles, has work in progress on a new hydroelectric generating plant for Big Creek system, to be equipped for capacity of 107,200 hp.; new transmission lines will be built. Construction is in progress also on new steam-operated electric power plant at Long Beach, to be known as steam station No. 3, with initial unit of 125,000 hp. It is proposed to add other units to latter plant to develop a total rating of 1,000,000 hp. Projects will represent investment of more than $10,000,000.

John O. Rankin, Long Beach, Cal., local representative for Cadillac automobile, has leased a two-story building, 75 x 140 ft., to be erected at First Street and American Avenue, for a service, repair and sales unit, reported to cost close to $90,000, with equipment.

Ovens, power equipment, conveying machinery and other mechanical equipment will be installed in connection with proposed rebuilding of baking plant of Torino Baking Co., 2801 Twenty-third Street, San Francisco, recently partially destroyed by fire with loss of about $100,000.

Seattle Lighting Fixture Co., Seattle, has leased a new one-story and basement factory, 97 x 105 ft., to be erected by Union Investment Co., at 829 Rainier Avenue, estimated to cost about $30,000, and will occupy for new plant. Fred B. Stephen, Thompson Building, is architect.

Bureau of Reclamation, Denver, Colo., is asking bids until May 25, for construction of 19.1 miles of 66,000-volt transmission line in vicinity of Adrian and Nyssa, Ore.

Centralia Lumber & Mfg. Co., Centralia, Wash., has acquired property at Ash and Pine Streets, and plans new mill with capacity of 75,000 ft. of finished lumber per day, reported to cost more than $85,000. Equipment will be electrically operated. W. C. Hamilton heads the company.

Ford-Nelson Motor Co., Ogden, Utah, has awarded a general contract to Vincent-Peterson Construction Co., 40 East Second Street, Salt Lake City, for a new one-story and basement service, repair and garage building, 100 x 165 ft., reported to cost about $90,000, with equipment, on site at 2222 Washington Avenue. C. D. Ford is head.

Board of County Supervisors, Salinas, Cal., has approved plans for one-story machine shop at county yard and mechanical plant, for repair of highway machinery, etc., estimated to cost close to $24,000, with equipment.

Hydrocarbon Apparatus, Inc., 405 South Hill Street, Los Angeles, has been formed to take over business of former Oil Engineering Co. and will engage in sale of mist ex-

tractors, steam separators, fractionators, scrubbers, stills, etc., for oil and chemical industries and power plants. Company will also handle products of Fisher Governor Co., Marshalltown, Iowa.

Canada

TORONTO, May 15.

PROSPECTS for business in machine tools were increased by several small lists which have just made their appearance. Included in current inquiries are lists from the Boards of Education at Welland and Toronto, Ont., which will purchase lathes, drills, woodworking equipment, etc., for vocational schools. The Canadian National Railways are purchasing tools and equipment for locomotive and machine shops under construction at Point St. Charles, Montreal, Que., while other small lists are appearing from time to time for replacement needs in other shops. The automotive industry is responsible for a steady flow of orders for single tools. Several industrial concerns are having lists prepared for tools and equipment required in connection with new plants and additions.

Niagara Falls Water Commission, Niagara Falls, Ont., is having plans prepared by F. A. Dallyn, 71 King Street West, Toronto, Ont., for the construction of a power house and filtration plant in Queen Victoria Park, to cost $400,000.

Canadian National Railways, McGill Street, Montreal, Que., have awarded contract to Anglin-Norcross, Ltd., 65 Victoria Street, for erection of the superstructure for the locomotive and machine shops at Point St. Charles. The project will cost approximately $1,000,000.

Gilmour Chair, Ltd., Coaticook, Que., is contemplating the erection of a factory there to cost $80,000.

Granby Elastic Web, Ltd., Granby, Que., has started excavation work in connection with a $50,000 addition to its plant there.

Hydro-Electric Commission, Tillsonburg, Ont., proposes to build a sub-station there and to instal larger transformers.

General Metal Devices, Ltd., Oakville, Ont., recently formed with a capital stock of $200,000, is calling for tenders for the erection of a factory building on Kerr Street, to be 60 x 300 ft., cement block and steel construction. Thomas Strachan, Toronto, is president.

T. J. Eansor & Sons' Structural Steel & Ornamental Iron Works, Windsor, Ont., is making arrangements for the building of a new manufacturing plant on property recently acquired.

Western Canada

City Council, Nelson, B. C., has started work on a power development plant at Bonnington Falls, B. C., to cost $230,000. The Canadian General Electric Co., has the contract for machinery and equipment.

Town Council Assiniboia, Sask., has provisionally accepted the offer of $120,000 for the local power plant made by the Dominion Electric Co. It is the intention of the company to start work immediately on the construction of a 900 hp. electric plant.

Substitution of electric current development in the low grade coal fields of Saskatchewan for the present power system is now engaging the attention of the Montreal Engineering Co. The first unit of a project to cost $1,000,000 is being constructed in the Estevan, Sask., field. It is the intention of the company to build five such units, and similar units will be built at four points in Alberta.

Crow's Nest Pass Coal Co., Ltd., Fernie, B. C., has decided to electrify its Coal Creek plant and is erecting the necessary buildings. A new power plant is under construction at Coal Creek, which will be equipped with three Bellis Morcham 300-ft. compressors and four Ingersoll-Rand 1200-ft., 4-stage compressors.

Foreign

PLANS are being arranged by Maudal Karftanlegg (Maudal Power Works), Stavanger, Norway, for a new hydroelectric power project at Maudalsfallene (Maudal Falls), with initial development to cost about $300,000. Project will require about 24 months for completion. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Norway No. 275041; also at American Consulate, Stavanger, F. C. Sigmond, vice-consul.

Davis Gelatine Pty., Ltd., Melbourne, Australia, has secured permission for construction of new glue factory at Flemington, about six miles from city, to cost in excess of $200,000 with machinery.

Russian Soviet Government, Petrograd, is planning construction of aluminum plant near Zaporozhie, vicinity of Dnieprostroy hydroelectric power development, now in progress, and which will furnish service for works. Initial plant will be equipped for capacity of 10,000 tons per annum, and is estimated to cost approximately $10,000,000. Amtorg Trading Corporation, 165 Broadway, New York, is official buying agency in United States.

Pomerania Electric Co. (Ueberlandzentrale Pommern, A. G.), Stettin, Germany, operating throughout Province of Pomerania, is disposing of bond issue of $3,500,000 in United States, a portion of fund to be used for expansion and improvements in power plants and system.

P. Lyall & Sons, Ltd., Montreal, Que., contractor, has closed a contract with Government of Colombia, South America, for construction of new railroad line between Tunja and Belez, to cost about $20,000,000, including engine terminals, locomotive and car shops, etc.

Free Zone Committee, Government of Greece, Athens, is planning for extensions and improvements at Port of Saloniki, including construction of wharves and jetties, erection of silo, installation of crane equipment and other mechanical elevating and conveying machinery. Entire project is estimated to cost 400,000,000 drachmas (about $5,203,000).

Railroad Administration, Government of Argentina, Buenos Aires, is planning a call for bids in fall for construction of new railroad line from La Paz-Feliciano to San Jaime, including engine terminals and shop facilities. American Consulate, Buenos Aires, Alexander V. Dye, commercial attaché, has information regarding project.

Contract for an electric bulb factory at Tokio, Japan, for Tokio Electric Co. has been awarded to H. K. Ferguson Co., Cleveland. Cost of building and equipment is estimated at $500,000. Building will be 120 x 205 ft., of two- and three-story reinforced concrete construction. Part of structure will have concrete roof with steel trusses.

Officials of Fox Brothers International Corporation, 33 Rector Street, New York, specializing in construction of light and power utilities, waterworks, sewage plants and other similar projects in foreign countries, have organized French subsidiary under name of Société Franco-Americaine d'Entreprises et de Travaux Publics, with headquarters at 33 Rue Cambon, Paris, to carry out such contracts in France, Roumania, Turkey, Greece and Poland. Branch offices will be opened at Constantinople and other points. John J. Teal is president of parent company.

Municipality in State of Coahuila, Mexico, is planning installation of municipal waterworks, including pumping machinery and other power equipment, estimated to cost $150,000, and is interested in using American-made equipment. Catalogs and information desired; it is purposed to begin work during summer. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Mexico No. 274425; also, at American Consulate, Piedras Negras, Mexico, Oscar C. Harper, vice-consul.

National Railways of Mexico, Mexico City, Mexico, have authorized an increase in monthly appropriation for extensions and improvements in lines, shop facilities and other mechanical expansion work, from 50,000 pesos (about $25,000) to 300,000 pesos (about $150,000).

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